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Final

Vault 630
Site Investigation and Closure Report
National Training Center Fort Irwin, San Bernardino County, California

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Prepared for

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CONTENTS

CONTENTS (Continued)

TABLES

FIGURES

ACRONYMS AND ABBREVIATIONS

APCL	Applied Physics & Chemistry Laboratory
bgs	Below ground surface
EPA	U.S. Environmental Protection Agency
mg/kg	Milligram per kilogram
OVA	Organic vapor analyzer
OWS	Oil-water separator
PCB	Polychlorinated biphenyl
PID	Photoionization detector
ppm	Part per million
PRG	Preliminary remediation goal
SVOC	Semivolatile organic compound
Tetra Tech	Tetra Tech EM Inc.
TPH	Total petroleum hydrocarbons
TPH-d	Total petroleum hydrocarbons as diesel
TPH-g	Total petroleum hydrocarbons as gasoline
TPH-mo	Total petroleum hydrocarbons as motor oil
USGS	U.S. Geological Survey
UST	Underground storage tank
VOC	Volatile organic compound
Water Board	Regional Water Quality Control Board – Lahontan Region
WWTP	Water waste treatment plant

EXECUTIVE SUMMARY

This investigation report presents the results of the field investigation conducted at the National Training Center Fort Irwin, Vault 630 site. The objectives of this investigation were to: (1) determine if cracks or voids exist in Vault 630 that would have allowed wastewater to impact subsurface soils, (2) determine if soil has been impacted by wastewater leaking from Vault 630 or its associated industrial wastewater treatment plant (WWTP) pipeline, and (3) determine if chemicals present in soil pose a threat to human health or groundwater.

Vault 630 is located within the Fort Irwin Cantonment area where the military housing and support facilities exist. The area surrounding Vault 630 is used for industrial activities, including vehicle wash rack operations and centralized storage of waste petroleum and antifreeze handled by the base hazardous waste service contractor. Vault 630 consists of a subsurface concrete vault that is approximately 40 feet long, 15 feet wide, and 11.5 feet deep. The vault walls and floor are approximately 15 inches thick. As shown in as-built diagrams, Vault 630 is constructed within a larger and deeper vault (former vault) that was closed prior to the construction of Vault 630 (SCS Engineers 1982). The bottom of the deeper vault is located at approximately 13 feet below ground surface (bgs).

This investigation included cleaning and inspecting Vault 630 to determine if cracks or voids exist in the bottom of the vault. To evaluate soil conditions in the vicinity of Vault 630, two soil borings were drilled adjacent to the vault, on the north side. These borings were logged at 10-foot intervals, and samples were collected to determine the vertical extent of any contamination detected. An organic vapor analyzer (OVA) was used to screen soil samples at 10-foot intervals. If organic vapors were consistently not detected for 20 feet, then the boring was terminated. The two borings were drilled to 41.5 feet bgs, where they were terminated based on no visual, olfactory, or OVA evidence of contamination. A third boring was cored through the bottom of Vault 630 to collect a soil sample directly beneath the vault.

To investigate if wastewater leaked from the WWTP pipeline, three additional borings were drilled along the pipeline and a soil sample was collected from each boring beneath the bottom of the pipeline.

Soil samples from this investigation were analyzed for total petroleum hydrocarbons (TPH) as gasoline (TPH-g), as diesel (TPH-d), and as motor oil (TPH-mo); semivolatile organic compounds (SVOC); volatile organic compounds (VOC); polychlorinated biphenyls (PCB); and metals. In addition to the analyses mentioned above, one soil sample was analyzed for the following physical parameters: moisture content, grain and bulk density, total porosity, total fluid saturation, effective permeability, and hydraulic conductivity.

TPH-d and TPH-mo were the primary chemical constituents detected in soil samples. TPH-g and TPH-d were detected at low concentrations in the soil sample from directly below Vault 630, with TPH-g detected at 1.3 milligrams per kilogram (mg/kg) and TPH-d detected at 112 mg/kg. The highest TPH concentrations were detected in samples collected adjacent to Vault 630, with a TPH-mo concentration of 3,660 mg/kg and a TPH-d concentration of 963 mg/kg detected in the sample from 5 feet bgs. The highest concentrations of TPH are confined between a concrete pad at the ground surface and the bottom floor of the former vault at 13 feet bgs. TPH concentrations decrease by at least an order of magnitude below the former vault, with the highest concentrations of TPH-mo and TPH-d being 680 mg/kg and 156 mg/kg respectively. The TPH-mo and TPH-d concentrations detected below the former vault, are believed to be from rainwater accumulated in the outer vault that seeped down the drilling auger as the borehole was advanced. No TPH-g was detected in samples below the former vault. Very low or estimated concentrations of TPH-mo were the only hydrocarbons detected along the WWTP pipeline, with the highest concentration being 27 mg/kg.

PCBs were not detected in soil samples, and only very low or estimated concentrations of VOCs and SVOCs were detected in soil samples, primarily from the boring directly beneath Vault 630 and above the outer vault floor. All VOCs and SVOCs detected below or adjacent to Vault 630 were below 1 mg/kg. All concentrations of metals were below the background metals concentrations established for Fort Irwin. The low concentrations of VOCs and SVOCs detected in soil samples were all below the U.S. Environmental Protection Agency (EPA) Region IX preliminary remediation goals (PRG) for residential exposure to contaminated soil.

The main area of contamination is confined above by the concrete floor of Vault 630 and below by the concrete floor of the former vault. TPH detected below the outer vault is not expected to present a threat to groundwater because: (1) the low concentrations of THP-mo and

THP-d detected below the outer vault and the dense soils encountered below the outer vault limit downward migration, (2) there is low potential for downward leaching of contaminants as the area is covered by concrete or asphalt and the area receives only 4 inches of rainfall annually, and (3) the depth to groundwater is approximately 120 feet bgs in the vicinity of Vault 630 site. The contaminants detected adjacent to and directly under Vault 630 do not pose a threat to human health because: (1) concrete at the ground surface and at the bottom of Vault 630 creates an incomplete pathway for direct contact to hydrocarbons, (2) no VOCs or lighter TPH were detected that would present a concern for vapor migration, and (3) all concentrations of metals were below EPA residential PRGs or within background metal soil concentrations established for Fort Irwin, and (4) low concentrations of VOCs and SVOCs were all below the EPA residential PRGs.

Based on the findings of the site investigation, Vault 630 should be closed in place and no further investigation be conducted at the site.

1.0 INTRODUCTION

Tetra Tech EM Inc. (Tetra Tech) received Task Order 9T3N020SH from the U.S. Army Corps of Engineers, under Contract Number GS-10F-0076K, to conduct and report on an investigation at Vault 630, a subsurface concrete vault that was used as secondary containment for an oil-water separator (OWS) at National Training Center Fort Irwin, California (Figures 1 and 2). This report describes those inspection and investigation activities that were performed at Vault 630 to facilitate vault closure. Remedial investigation activities performed at National Training Center Fort Irwin, such as the Vault 630 investigation, are conducted under the Defense Environmental Restoration Program, Installation Restoration Program. The investigation activities were conducted in accordance with regulatory agency guidance documents identified in the Vault 630 Work Plan (Tetra Tech 2004) because petroleum hydrocarbons were the primary contaminants of concern, underground storage tank (UST) case closure principles were followed in evaluating the site.

The scope of the Vault 630 investigation was to: (1) remove the steel grates and standing water and debris from Vault 630, (2) identify if cracks or areas of staining exist where water containing waste oil may have leaked through the vault, (3) collect soil sample data to evaluate if a release to the environment occurred through the vault or overflow piping, (4) grout the sampling locations and clean the vault by pressure washing, and (5) review data to assess if the Vault 630 can be closed. Vault 630 will be closed by razing the side walls to existing grade, filling the vault with inert material (e.g. pea gravel or concrete slurry), and covering the top of the vault to grade.

This report is organized into six sections. This section provides an introduction and discusses the purpose of this investigation and report. Section 2.0 provides the background for this investigation, which includes site history and physical conditions (geology and hydrogeology). Section 3.0 describes the site conceptual model used to guide the investigation and data analysis, and the regulatory closeout procedure for Vault 630. Section 4.0 describes the activities conducted during the investigation and deviations from the Vault 630 Work Plan (Tetra Tech 2004). Section 5.0 describes the nature and extent of contamination at the site based on analytical results obtained from the current investigation. Section 6.0 summarizes the

conclusions of the investigation based on the analytical results and provides recommendations for closure of Vault 630. References for this report are provided following Section 6.0, and tables and figures and Appendices A through G are presented after the references.

This report also contains six appendices. Appendix A provides the confined space entry permit. Appendix B contains the soil boring logs for each location sampled during this investigation. Appendix C provides a photographic log for the Vault 630 investigation. Appendix D presents the analytical and physical parameter data for Vault 630. Appendix E contains the data validation report. Appendix F provides the hazardous waste manifest.

2.0 SITE BACKGROUND

This section provides a physical description and history of Vault 630.

2.1 VAULT 630 SITE DESCRIPTION

Vault 630 is located in an area of industrial and training activities and near the Fort Irwin Cantonment area where the housing and support facilities are located (Figure 2). Vault 630 consists of a subsurface rectangular concrete vault measuring approximately 40 feet long, 15 feet wide, and 11.5 feet deep. The vault walls and floor are approximately 15 inches thick. During the site visit in June 2003, staff observed that the vault contained a 1- to 2-inch-thick layer of paper debris and soil. No cracks were observed on the sidewalls of the vault. The vault is currently covered on the top by three removable steel grates.

As-built drawings obtained from the vicinity of Vault 630 show that a former vault exists to the northwest and that Vault 630 was constructed within the former vault (SCS Engineers 1982). The drawings show a 15-inch concrete slab underlying Vault 630 and a concrete wall bounding the southeast side of the vault. The drawings also show that the concrete below Vault 630 is located at approximately 13 feet below ground surface (bgs).

The Vault 630 site consists of the concrete vault (described below) that includes a concrete curb around the perimeter. A former vault exists to the northwest that is now backfilled and covered with concrete and also includes a perimeter concrete curb. An OWS is to the north of Vault 630, and a concrete wash rack lined with a concrete curb lies to the northeast. Northwest of the

former vault are six concrete wash bays, and an associated concrete pad is located to the west of these wash bays (Figure 3). Also to the northwest of the Vault 630 is Building 630 that serves as a base of operations for the Fort Irwin hazardous waste service contractor. Spent petroleum-based products and waste antifreeze generated throughout the Fort Irwin area accumulated in the area near Building 630. The remainder of the site is unpaved and the facility remains an active hazardous waste management operation. The wash rack, wash bays, and OWS are currently in use.

Drainage on the concrete covered areas around Vault 630 is contained by the concrete curbs, while drainage on the unpaved surfaces is uncontrolled and generally flows away from the site.

Vault 630 was used as an overflow basin for an OWS that collected rinse water from a vehicle wash rack. The water containment system for the wash rack was designed so that if the OWS failed to operate properly, oil-laden water would overflow through a pipe to Vault 630. After repairs, the oily wastewater in the vault would be returned to the OWS through a sump pump. In emergency situations, if the overflow was too great for the vault, the vault was designed to discharge to the industrial wastewater treatment plant (WWTP) through an overflow pipe at the top of the vault. According to Jim Combe, operations manager for waste disposal at Fort Irwin, the vault was lined with plastic or rubber, which was removed in 1989 when the vault was cleaned and no longer used as an overflow basin for the OWS (Tetra Tech 2003). As a result, the overflow pipe discharge line to the WWTP is also, no longer in use.

After 1989, the vault was used for secondary containment of two 5,000-gallon waste oil and two 5,000-gallon waste fuel tanks that were located on top of Vault 630. Leaks from the tanks that may have occurred during this time would have collected in the vault and transferred back to the OWS through a sump pump.

Investigations of Vault 630 were performed in 1993 that included collection of confirmation wipe samples (630W-1 through 630W-6) following decontamination of the vault and soil samples (630S-1 and 630S-2) from below the Vault 630. Six wipe samples and two soil samples were collected and tested for (1) volatile organics (VOCs) using methods 8020 and toxicity characteristic leaching potential (TCLP) for selected organics using EPA methods 1311 and 8240, and (2) total recoverable hydrocarbons (TRH) using EPA method 418.1. (Smith

Environmental Technologies Corporation (Smith), 1995). One background soil sample (620B-1) was also collected and tested for VOCs and TRHs. All VOC analyses for the soil samples were below the laboratory minimum detection limits and TRH results were all below 100 mg/kg. Table 1 summarizes all the sample results from the 1993 investigation by Smith. Figure 3 shows the locations of these previous investigation samples.

Oily wastewater may have leaked through cracks in the vault, or along the WWTP pipeline system, to the underlying subsurface soils. Because the vault received oily wastewater, common constituents of waste oil, including metals, semivolatile organic compounds (SVOC), polychlorinated biphenyls (PCB), total petroleum hydrocarbons (TPH), and volatile organic compounds (VOC), may have been released, which could create a risk to human health or underlying groundwater.

2.2 PHYSICAL SETTING

Vault 630 is located within the industrial/training facilities area at Fort Irwin (Figure 2).

Vault 630, the former vault to the northwest, and the wash rack to the northeast are each covered with concrete and surrounded by a concrete curb perimeter. The remainder of the site is unpaved (Figure 3). Surface drainage on the concrete surfaces or in Vault 630 is contained by the concrete curb perimeter. The unpaved portions of the site are generally flat, but surface flow is generally away from Vault 630. The WWTP pipeline is active and is located approximately 14 feet bgs.

The following sections summarize the climate and meteorology of the Fort Irwin area, regional and site geology and hydrogeology, groundwater flow in the Fort Irwin Basin and recharge, and the geology encountered in the current investigation.

2.3.1 Climate and Meteorology

The semi-arid climate of the Fort Irwin area is typical of the Basin and Range geomorphic province in general and of California's Mojave Desert in particular. Rainfall is infrequent, temperatures are warm to hot with large seasonal diurnal ranges, relative humidity is low, and clear skies predominate. Temperatures vary from a mean winter maximum of 60 °F to a mean

winter minimum of 32 °F in January and a mean summer maximum of 106 °F to a mean summer minimum of 73 °F in July. Annual precipitation is approximately 4 inches, falling mostly from November through March, with more than half of the precipitation falling from December to February. Sporadic rainfall may occur from thunderstorms forming in the summer months.

2.3.2 Geology of Fort Irwin Basin

Mountainous areas that consist predominately of igneous and metamorphic rocks surround the Irwin Basin (Yount and others 1994). Miocene volcanic rocks, consisting of basalt, andesite, rhyolite, and tuff, make up the mountainous areas on the northern and western sides of the basin. Jurassic plutonic rocks (Quartz Monzodiorite) also outcrop on the northern and western sides of the basin. Mountains on the southern side of the basin are characterized by Jurassic plutonic rocks (Quartz Monzodiorite) as well as Cambrian to Late Proterozoic Marble. Metamorphic rocks, consisting of schist, gneiss, and amphibolite, outcrop in the mountainous areas on the eastern side of the basin.

The floor of the Irwin Basin is covered with as much as 950 feet of unconsolidated alluvial deposits (Densmore and Londquist 1997; Densmore 2003). The deposits consist of older alluvium of late Tertiary to Quaternary age and younger alluvium of Quaternary age. Alluvial fan deposits consist of sand, gravelly sand, and sandy gravel eroded from the adjacent mountain fronts. Other Quaternary units in the Irwin Basin consist of Holocene wash deposits (sand and sandy gravel) associated with intermittent streams; colluvial deposits from talus and rockfall areas of mostly gravel; spring deposits that are made of carbonate-cemented silt and sand; and eolian (windblown) deposits made of fine- to medium-grained sand.

2.3.3 Hydrogeology of Fort Irwin Basin

Irwin Basin is a nearly closed aquifer system that is linked to the Langford Basin to the southeast by an unnamed wash near Garlic Springs, with boundaries along the margins of the Irwin Basin proper (Densmore 2003). Furthermore, the U.S. Geological Survey (USGS) groups geologic units of the Irwin Basin region into the following two categories based on their hydrogeologic characteristics: water-bearing and non-water-bearing. Water-bearing units

were subdivided into an upper aquifer (unconfined) and a lower aquifer (confined) (Densmore 2003). The upper aquifer comprises the saturated part of the younger unconsolidated Quaternary alluvium and is up to 200 feet thick in the west-central part of the basin. The lower aquifer is a maximum of 600 feet thick and comprises older Quaternary semiconsolidated alluvium. Data collected during aquifer testing at wells located within the Irwin Basin indicated that the hydraulic conductivity of the aquifer ranges from 1 to 25 feet per day (Densmore 2003).

Available information indicates that the alluvial aquifer of Fort Irwin Basin is characterized by unconfined conditions (Densmore 2003). The saturated zone of Fort Irwin Basin generally begins at a depth of between 100 and 300 feet bgs (approximately 2,300 and 2,000 feet above mean sea level). At the Vault 630 site, groundwater is approximately 120 feet bgs. A potentiometric surface map was constructed based on preliminary water level measurements collected by USGS from wells located in Fort Irwin Basin (USGS 2000) and groundwater elevation data collected in March 2005, by USGS and obtained from Fort Irwin staff, confirmed the depth to groundwater in the area to be approximately 120 feet bgs. Groundwater flow is generally toward the center of the basin, and the lowest groundwater elevations occur in the center of Fort Irwin Basin, near the Vault 630 site, where periodic pumping reportedly has created depression in the water table (Densmore 2003).

In the Fort Irwin Basin, groundwater from wells unaffected by artificial recharge does not contain measurable concentrations of tritium (Densmore and Londquist 1997). Therefore, it was concluded that recharge through precipitation is an insignificant portion of the water budget in the Fort Irwin Basin (Densmore 2003).

2.3.4 Geology Encountered in Vault 630 Investigation

Soils observed in the borings drilled adjacent to Vault 630 and in borings drilled adjacent to the pipeline to the WWTP consisted of sands, silty sands, and gravelly sands to the total explored depth of 41.5 feet bgs. During drilling, groundwater was not encountered in this investigation. Standard penetration test blow counts in the soils from 14 to 41.5 feet bgs measured greater than 50 blows per 12 inches, indicating very dense soil.

3.0 ENVIRONMENTAL PROBLEM FORMULATION

This section describes the site conceptual model for Vault 630 and the regulatory framework at the site.

3.1 SITE CONCEPTUAL MODEL

A site conceptual model for Vault 630 is presented on Figure 4. The site conceptual model was developed to: (1) facilitate an understanding of the physical characteristics, historical operations, and contaminant release mechanisms associated with Vault 630; (2) guide the site characterization activities; and (3) assess fate and transport mechanisms associated with past releases discovered during the site characterization.

Vault 630 is constructed within a former vault as shown on Figure 4. This former vault floor is approximately 13 feet bgs. Vault 630 was used as an overflow basin for an OWS associated with the vehicle wash rack. After discontinuing its original use around 1989, the vault was used as secondary containment for aboveground storage of waste oils and waste fuel.

Releases from Vault 630 may have occurred due to cracks or voids in the concrete floor, or leaks along the overflow piping that extended from the vault and discharged to the WWTP. Releases from the vault could spill on to the concrete foundation of the former vault, and cracks in this concrete structure may allow further downward migration. Migration in the vadose zone due to leaks from the piping or below the subsurface concrete structure would be limited by very dense alluvial deposits composed of varying amounts of silt, sand, and gravel.

The transport mechanisms for downward migration of contaminants released from Vault 630 would have been (1) via downward movement of wastewater collected in the vault during its original operation, or (2) from rainwater that accumulated in the vault during the time that the vault was used for secondary contaminant. Depth to groundwater in the area of Vault 630 is approximately 120 feet bgs. Because Vault 630 is no longer used and sediments and liquids accumulated in the vault were removed during its cleanout as part of the field investigations, no further potential exists for release of contaminants from 630 vault.

Site characterization focused on assessing: (1) the types of contaminants that may have been released from Vault 630 during its operation, and (2) the extent to which these contaminants may have or will migrate. As a result, the investigation focused on the following two principal questions.

1. Do chemical concentrations present in soils beneath Vault 630 or the associated WWTP piping present a concern for direct exposure based on soil screening criteria?
2. Do chemical concentrations present in soils below Vault 630 and the former vault or the associated WWTP piping present a threat to groundwater?

Because Vault 630 was used to hold wastewater from OWS overflow and for secondary containment for waste oil, samples collected during site characterization were analyzed for a wide range of chemicals. Analyses performed included VOCs, SVOCs, PCBs, pesticides, metals, and TPH as gasoline (TPH-g), TPH as diesel (TPH-d), and TPH as motor oil (TPH-mo).

3.2 REGULATORY FRAMEWORK

Petroleum hydrocarbons are the primary chemicals of concern at the site, and TPH were evaluated using Water Board guidelines for assessing TPH at UST sites (Water Board 2004). Other organic chemical constituents (VOCs, SVOCs, PCBs, and pesticides) and metals detected in soil samples were compared with U.S. Environmental Protection Agency (EPA) Region IX preliminary remediation goals (PRG) (EPA, 2004) to assess potential concerns for exposure to chemical concentrations detected in soil samples. Although the area is used for industrial activities, residential PRGs were selected for screening because they are more comprehensive and therefore more protective.

Whether the Vault 630 site qualified for closure was evaluated using the Water Board's fact sheet on petroleum hydrocarbon cleanup approach to soils (Water Board 2004). Results of this evaluation are presented in Section 5.0.

4.0 INVESTIGATION ACTIVITIES AT VAULT 630

This section summarizes the field investigation activities. These activities included: (1) cleaning and inspecting Vault 630, (2) performing utility clearance and selecting soil boring locations, (3)

drilling and lithologic logging of five soil borings, and (4) collecting soil samples from the five borings. Photographs taken during the investigation activities are included in Appendix C.

4.1 VAULT 630 CLEANING AND INSPECTION

Precision Sampling of Richmond, California, cleaned and inspected Vault 630 under the supervision of Burleson Consulting and the U.S. Army Corps of Engineers. Prior to cleaning, the steel grates covering Vault 630 were removed by hand. The grates were retained and used to cover the vault at the end of the cleaning and inspection. After removing the grates, Precision Sampling installed two blowers at the southwest end of the vault to force fresh air into the vault. The atmosphere of the vault was then tested for confined space entry. Based on the test results, it was established that the vault atmosphere was unacceptable for non-permitted confined space entry and Precision Sampling obtained a confined space entry permit. This permit is included as Appendix A to this report. The vault was accessed using a permanent ladder mounted on the vault wall. Additionally, Precision Sampling staff that entered the vault wore a harness and was tied to a rope above the vault to comply with procedures for confined space entry at Fort Irwin. Equipment necessary to perform the cleaning was lowered into the vault using a tripod-mounted winch and safety cables.

Approximately 2,900 gallons of rainwater that had recently collected in the vault was removed using a trailer-mounted vacuum pump and a 500-gallon storage tank. Rainwater may have accumulated in the vault directly through the opening at the top of the vault or through seams or cracks in the vault sidewalls that allow infiltration. Following the removal of rainwater, debris and sludge inside the vault were shoveled to the eastern corner of the vault and vacuumed up to the storage tank. Following the removal of the debris, the vault was washed using a pressure washer. The vault wash water and the 2,900 gallons of rainwater were pumped into the adjacent wash rack for disposal. The 500 gallons of sludge, debris, and final rinsate was transported to the biofarm at the Fort Irwin Landfill on December 7, 2004. After pressure washing, the vault was inspected for areas of cracks or voids. The inspection revealed that portions of the gasket material that sealed the 1.25- to 2-inch-wide gap between the vault walls and the floor were missing in the northern, eastern, and western corners of the vault. Once the cleaning and inspection were complete, the steel grates were returned to the vault and secured for safety.

4.2 UTILITY CLEARANCE AND SELECTION OF SOIL BORING LOCATIONS

Johnson Control marked the underground utilities surrounding Vault 630. Several water lines and electrical lines were located just southwest and southeast of the vault, including a high voltage electrical line. Fort Irwin prohibits drilling within 6 feet of an electrical line; therefore, no borings could be located on the southwest, south, or southeast sides of the vault.

Soil borings were located and drilled to assess the impact to soil adjacent to and below Vault 630 and below the WWTP pipeline.

Two soil borings (SB01 and SB02) were located within approximately 5 feet adjacent to the northwest side of Vault 630 (Figure 5). These boring locations were chosen to assess the vertical extent of contamination that may have migrated from Vault 630. Additionally, one soil sample was collected from beneath Vault 630 at boring (SB04). The sample was collected by coring though the concrete floor of Vault 630 and sampling the soil below. This sampling location was chosen to assess if wastewater stored in Vault 630 had impacted the soil directly beneath the vault.

Three additional soil borings (VE01, VE02, and VE03) were located along the pipeline that leads to the WWTP (Figure 5). Soil borings VE01 and VE02 were placed adjacent to a manhole along the pipeline, where the line turns 90 degrees to the southeast. The third boring, VE03, was placed approximately 20 feet further southeast along the pipeline. These borings were completed to assess if the pipeline had leaked and impacted surrounding soil.

4.3 SOIL BORING LOGGING AND SAMPLING

Field activities took place on December 8 and December 9, 2004. Soil borings SB01 and SB02 were drilled to 41.5 feet bgs using hollow-stem auger drilling equipment. The soil borings were drilled by Cascade Drilling of Los Angeles, California. The Vault 630 Work Plan stated "sampling at each location will continue until a minimum of 20 feet of "clean" soil has been observed (through field screening) below the level of obvious contamination, or a maximum depth of 80 feet bgs has been reached" (Tetra Tech 2004). Using this protocol, the borings were terminated at 41.5 feet bgs because no visual, olfactory, or organic vapor analyzer (OVA) detections were noted below 20 feet bgs.

Soil borings VE01, VE02, and VE03 were drilled to 19.5 feet bgs using hollow-stem auger drilling equipment. Borings VE01 and VE02 were drilled within approximately 3 feet of the manhole associated with the WWTP pipeline, and boring VE03 was completed approximately 20 feet southeast of the manhole adjacent to the WWTP pipeline. Soil samples were collected at the bottom of each boring. A fourth boring was drilled approximately 2 feet southwest of the manhole, but was terminated at 15 feet bgs due to drilling equipment refusal, which was assumed by the driller to be concrete. No samples were colleted from this boring. Borings VE01, VE02, and VE03 contained orange-brown, dense gravelly sand and sand to approximately 15 to 16 feet bgs. This sand was underlain by very dense, light brown gravelly sand to the total explored depth of 19.5 feet bgs.

Hard drilling conditions were encountered at depths ranging from 14 to 41.5 feet bgs in borings SB01, SB02, VE01, VE02, and VE03. Prior to drilling borings SB01 and SB02, 10-inch diameter holes were cored through the concrete. Underlying the concrete, borings SB01 and SB02 contained light brown, poorly graded fill sand and sandy gravel to approximately 13 feet bgs. The lower 3 to 9 feet of fill in boring SB01 contained petroleum odor and staining. In boring SB02, a gray sludge was encountered at 13 feet bgs. A 6-inch concrete floor of the former vault was encountered at approximately 13 feet bgs. Native soil, consisting of brown, poorly graded dense sand, was encountered below the former vault to approximately 25 feet bgs. This soil was underlain by very dense poorly graded sand, gravelly sand, and silty sand to the total explored depth of the boring at 41.5 feet bgs.

Photoionization (PID) readings in boring SB01 measured 5 parts per milling (ppm) and 8 ppm at 5 and 10 feet bgs, respectively. PID readings from 15 feet bgs to the bottom of the boring, and below the concrete of the former vault, measured from 0 to 0.5 ppm. PID readings in boring SB02 were 3 ppm and 2 ppm at 5 and 10 feet bgs, respectively, and decreased to 0 ppm below the concrete of the former vault to the bottom of the boring.

Soil boring SB04 was drilled through the bottom of Vault 630 using an electric coring device. Twenty-four inches of concrete was removed from the bottom of the vault. Following the concrete removal, a sample was collected of a sludge type material between Vault 630 and the

former vault. The concrete of the former vault was encountered approximately 1 foot below Vault 630. The locations of the soil borings are shown on Figure 5.

Thirteen soil samples were collected from the borings. Sample analyses are described in Section 4.4. Appendix B presents the complete soil boring logs, and Section 2.3.2 describes the lithology observed during drilling.

4.4 SOIL SAMPLE ANALYSES

Nine soil samples were collected from borings SB01 and SB02 for laboratory analysis during field investigations. Four soils samples were collected between 0 and 13 feet bgs (above the former vault), and five additional soils samples were collected beneath the former vault. Additionally, one sample was collected from boring SB04, directly beneath Vault 630 and above the former vault. OVA readings from this boring indicated that contamination was present directly beneath Vault 630.

One soil sample was collected from each of the three borings VE01, VE02, and VE02. The three samples were collected at 18 feet bgs because the bottom of the discharge pipe is located at approximately 15 feet bgs. The depth of the pipeline was determined by lowering a tape measure into the manhole located northeast of the wash rack.

After the samples were collected, they were immediately stored in a cooler packed with ice. Chain-of-custody forms were completed and accompanied the samples following collection, during transport by the courier, and at receipt by the analytical laboratory. The chain-of-custody forms are included at the end of Appendix D

Table 2 presents the sample analysis matrix. Samples were analyzed for VOCs, SVOCs, TPH, PCBs, and metals by Applied Physics & Chemistry Laboratory (APCL) of Chino, California. Physical properties, such as soil porosity, density, and permeability were analyzed by PTS Laboratories, Inc., of Santa Fe Springs, California. Table 3 summarizes the PCB, SVOC, TPH, and VOC results, and Table 4 presents the metals results. The complete set of laboratory analytical data is presented in Appendix D.

The chemical data presented in this report are validated and definitive. Laboratory Data Consultants, Inc., of Carlsbad, California, performed the analytical data validation. The data validation was performed in accordance with guidelines set forth in the EPA Functional Guidelines (EPA 1994a, 1994b). The validation report is presented in Appendix E.

4.5 INVESTIGATION-DERIVED WASTE

Investigation-derived waste was collected, stored, analyzed, and disposed of according to guidelines identified in the Vault 630 Work Plan (Tetra Tech 2004). The Vault 630 liquid contents and the vault wash water were pumped into the wash rack for disposal. Sediment and sludge removed from the bottom of Vault 630 was transported via a vacuum truck to the Fort Irwin disposal facility. A sample of the vault wash water was collected and sent to APCL for analyses of VOCs, SVOCS, and purgeable and extractable TPH.

In total, 10 55-gallon drums were used to contain investigation-derived waste: 8 drums for soil cuttings and 2 drums for decontamination water. A composite sample was collected from the drums containing soil cuttings and sent to APCL for analyses of VOCs, SVOCS, purgeable and extractable TPH, and reactivity, corrosiveness, and ignitability. A water sample from the decontamination water was also sent to APCL with the same analyses except for reactivity, corrosiveness, and ignitability.

On March 8, 2005, the soil drums and the drums containing decontamination water were sent to DK Environmental in Vernon, California, a Fort Irwin contractor and licensed off-site disposal facility. The hazardous waste manifest is presented in Appendix F.

4.6 DEVIATIONS FROM VAULT 630 WORK PLAN

The Vault 630 Work Plan proposed drilling four soil borings adjacent to Vault 630 (Tetra Tech 2004). Two semi-vertical borings were proposed to investigate the vertical extent of potential contamination below the edge of Vault 630, and two slant borings were proposed to characterize soils directly below Vault 630.

Two borings were originally proposed on the southeast side of Vault 630, but due to the utilities present and Fort Irwin regulations regarding drilling adjacent to utilities, borings could only be

performed on the north/northwest side of the vault. In addition, a boring was completed within the vault.

Due to physical constraints as well as the very dense soils encountered, no angled borings could be completed. An angled boring was attempted adjacent to VLT630-SB01, but due to the dense soils encountered, and the concrete encountered at 13 feet bgs, the boring could not be completed. Therefore, all borings were drilled vertically adjacent to Vault 630. In total, three borings were completed adjacent to Vault 630, instead of the four borings proposed in the Vault 630 Work Plan (Tetra Tech 2004). However, a fourth boring was completed within the vault. In addition, although one boring was located directly below Vault 630, the other three boring were located directly below the former vault.

As described in the Vault 630 Work Plan (Tetra Tech 2004), a high pressure vacuum excavation device was proposed to be used to expose the side of the WWTP pipeline and a hand auger would be used to collect a sample approximately 6 inches below the pipe. However, because the pipe was located at 15 feet bgs, well below the reach of the vacuum excavation device, the hollow-stem auger drill rig was used to collect samples beneath the pipeline. Because of the size of the drill rig and the restricted access to the area caused by the wash rack and a chain link fence, the boreholes were installed approximately 3 feet away from the WWTP pipeline and the manhole.

Fate and transport modeling was originally considered to assess the potential for releases from Vault 630 to migrate to groundwater. However, Vault 630 was constructed within a larger former vault, which would contain waste released from Vault 630, THP concentrations detected outside the former vault were considered low, and depth to groundwater is over 200 feet. As a result, fate and transport modeling was not required to assess the impact of chemical concentrations in soil on groundwater.

5.0 INVESTIGATION RESULTS AND VAULT 630 CLOSURE EVALUATION

This investigation and subsequent data analysis focused on determining if contaminants were present in soil below Vault 630 and, if so, what is the potential threat to human health via direct contact and to groundwater via vertical migration.

The chemical and physical parameter results from this investigation are presented below. TPH data are presented on Figure 6. All detected chemicals from this investigation are presented on Tables 3 and 4. Appendix D contains a complete summary of all the chemical and physical parameter data from this investigation.

5.1 TOTAL PETROLEUM HYDROCARBONS AND BENZENE, TOLUENE, ETHYLBENZENE, AND XYLENES

The highest TPH concentrations are present between 5 to 10 feet bgs northwest and adjacent to Vault 630, within the fill material contained by the former vault. As discussed below, concentrations of TPH are significantly lower below the concrete of the former vault located at 13 feet bgs.

TPH-d and TPH-mo were detected in soil samples collected from borings SB01 and SB02. Within the former vault, TPH-d was detected at concentrations ranging from 14.2 milligrams per kilogram (mg/kg) (boring SB02 at 40 feet bgs) to 963 mg/kg (boring SB01 at 5 feet bgs). TPH-mo was detected at concentrations ranging from 57.9 mg/kg (boring SB02 at 35 feet bgs) to 3,660 mg/kg (boring SB01 at 5 feet bgs).

As noted in Table 3 and on Figure 6, TPH-d and TPH-mo concentrations below the former vault are at least an order of magnitude lower than concentrations in the samples collected within the former vault. The highest TPH-d and TPH-mo concentrations below the former vault were 156 mg/kg and 680 mg/kg, respectively (boring SB01 at 40 feet bgs). The probable source of TPH contamination detected beneath the floor of the former vault is TPH-impacted fill materials and accumulated rain water encountered above the former vault and carried below the former vault after the concrete floor was drilled through and the boring was advanced deeper. These bore holes were sealed after completion of sampling. Field observations and site conditions that support this determination include:

- Grey sludge is noted in log SB02 above the concrete of the outer vault. This same grey sludge is noted as being at the "top of the sample interval" at the sample depths of 30 and 35 feet.
- Log SB02 shows the sample intervals at the 20, 30, and 35 foot depths were only "wet at the top of the sample interval". This indicates the native formation was not wet and that

the liquid limited to the top of the interval is likely due to seepage down the auger as the borehole was advanced.

- Drilling conditions were very hard and soils are densely packed indicating limited ability for liquid or sludges to migrate to depth. For example, most sample intervals below the outer vault concrete had blow counts of 50 which only advanced the samplers 4 to 6 inches. Also, as noted in the logs and narrative in section 4.3, the formation contained very dense layers of sands, gravely sands, and silty sands.
- The lithologic conditions at Vault 630 are similar to FTIR-027 based on the drilling conditions and field logs. The vadose zone and transport modeling done for FTIR-27 indicated very limited potential for downward migration TPH (including the more mobile lighter TPH fractions).

TPH-d and TPH-g were both detected in boring SB04 in sludge-like samples collected between the floor of Vault 630 and the underlying floor of the former vault at concentrations of 112 mg/kg and 1.3 mg/kg, respectively. No TPH-mo was detected in this boring.

Only low and estimated concentrations of TPH-mo were detected in borings VE01 and VE03 at 26.9 mg/kg and 7.7 J mg/kg respectively. The J qualifier indicates that the concentration of 7.7 mg/kg is estimated and between the laboratory practical quantitative limit and the method detection limit. No TPH-d or TPH-g was detected in samples from any of these borings.

Benzene, toluene, ethylbenzene, and xylenes were only detected at low or estimated concentrations in this investigation, primarily in the sample collected beneath Vault 630 (Table 3). All benzene, toluene, ethylbenzene, and xylenes concentrations detected were below the residential PRG screening criteria. Although the Vault 630 area is used for industrial operations, all detected concentrations were compared with EPA residential PRGs (EPA, 2004) because of the low concentrations detected or estimated. Both the residential and industrial EPA PRGs are show in Table 3.

5.2 POLYCHLORINATED BIPHENYLS, SEMIVOLATILE ORGANIC COMPOUNDS, VOLATILE ORGANIC COMPOUNDS, AND METALS

No PCBs were detected during this investigation.

Very low and primarily estimated concentrations of SVOCs and VOCs were detected in the sample from boring SB04 collected directly below Vault 630 and above the outer vault floor (Table 3). All of the detected chemicals were below the residential PRGs. Both the residential

and industrial EPA PRGs are show in Table 3. Additionally, the constituents detected below Vault 630 are confined between Vault 630 and the former vault.

Metals detections in this investigation were also all below the EPA residential PRGs except for arsenic, which ranged in concentrations from 1.7J mg/kg to 4.9 mg/kg, but was within the background upper tolerance limit (95 percent) of 9.14 mg/kg (Parsons 1996). Metals detections are presented in Table 4, along with the EPA residential and industrial PRGs and background metals values for Fort Irwin.

5.3 VAULT 630 CLOSURE EVALUATION

Based on the analytical data collected during this investigation, Vault 630 has been evaluated for closure using the Water Board UST criteria for TPH constituents and using EPA Residential PRGs for other chemical constituents. The Water Board states the following in a fact sheet on petroleum hydrocarbon cleanup approach to soils:

> "Board staff's experience in the Lahontan region has found that sites with lighter fractions of petroleum hydrocarbons (C_1-C_{15}) in dry climates must have at least a 50-foot separation from the highest historical ground water table. Sites with heavier fractions of petroleum hydrocarbons (heavier than C_{20}) must have at least a 25-foot separation from the highest historical ground water. Sites that meet these criteria are allowed to have higher soil concentrations remaining at closure" (Water Board 2004).

Vault 630 qualifies for closure under these criteria because (1) the primary chemicals detected are heavier hydrocarbons and (2) the depth to groundwater is approximately 120 feet bgs. The highest concentrations of petroleum hydrocarbons detected in this investigation are above and contained by a former concrete vault. The detected concentrations of TPH at the 41 foot depth are likely due to seepage from within the outer vault when the concrete floor of the outer vault was penetrated during drilling as described in section 5.1. This hole in the outer vault concrete floor was grouted and sealed after completion of the boring to prevent any further seepage.

Groundwater in the area is currently at approximately 120 feet below ground surface. As a result, the Army does not believe the petroleum concentrations detected in soil samples below the outer vault that resulted from downward seepage during the soil boring present a potential threat to

groundwater. In 1999, USGS studies estimated the groundwater may rise up to 65 feet in the center of the basin and 10 feet in the eastern area near the waste water treatment plant. As a result, the groundwater table is not assumed to rise to a level to mobilize these low concentrations of hydrocarbons. In addition, TPH reported at 41 feet is believed to have occurred due to the drilling and these concentrations in deeper soils are well below those that would be considered mobile in soil and migration of the TPH in soil is unlikely.

In addition, all VOCs and SVOCs detected were well below the EPA residential PRGs and no VOCs or lighter fraction hydrocarbons were detected that present a vapor migration concern in the Vault 630 area. Metals concentrations detected in soil samples were all below the 95 percent upper tolerance levels established for background concentrations at Fort Irwin area (Parsons 1996). Except for arsenic, all metals concentrations were below EPA residential PRGs. Arsenic concentrations, although above EPA PRGs, are all below the background concentration established at Fort Irwin.

6.0 CONCLUSIONS AND RECOMMENDATIONS

This section presents the conclusions of the Vault 630 investigation based on the analytical results, and the recommendations for closure of Vault 630.

6.1 CONCLUSIONS

Presented below are the conclusions for the Vault 630 investigation as they pertain to the following two principal questions asked in this investigation:

Do chemical concentrations present in soils below Vault 630 or the associated WWTP pipeline present a concern for direct exposure based on soil screening criteria?

Chemical concentrations present in soils below Vault 630 or the associated WWTP pipeline do not present a human health concern based on direct exposure to the soil for the reasons listed below.

- The TPH zone of contamination was detected in fill soil within the former vault, which is covered with concrete at the surface, preventing direct contact and migration.

- Concentrations of VOCs and SVOCs detected in soil were below the EPA residential PRGs; therefore, they are not a threat to human health.

- Concentrations of metals detected in soil samples were all below EPA residential PRGs except for arsenic, which is within the background upper tolerance limits established for Fort Irwin.

- VOCs are not present in subsurface soils at concentrations that would present a threat for vapor migration. No appreciable VOCs were detected in soil samples, and results of field screening during drilling activities also indicated low to no field instrument responses for VOCs.

- Soil samples collected along the WWTP pipeline indicated that there has not been a release of contaminated wastewater to soil from the pipeline.

Do chemical concentrations present in soils below Vault 630, the former vault, or the associated WWTP piping present a threat to groundwater?

Chemical concentrations present in soils below Vault 630, the former vault, or the associated WWTP piping do not present a threat to groundwater for the reasons listed below.

- TPH present in soils adjacent to and beneath Vault 630 are primarily heavier hydrocarbons (diesel and motor oil range) and are not considered as mobile as lighter hydrocarbons.

- Concentrations of petroleum hydrocarbons detected below the former vault were at least an order of magnitude less than those detected above the vault and detected at low concentrations for THP-mo and TPH-d.

- The site meets Water Board criteria for a 25-foot separation of heavier fraction petroleum hydrocarbons present in soil because groundwater in the area is greater than 120 feet bgs and low concentrations of TPH-d and TPH-mo detected at 41 feet bgs are due to seepage from the former vault during drilling.

- Mobility of contaminants present in soil is severely restricted due to the low residual concentrations, the concrete associated with the former vault, concrete at the surface prohibiting infiltration into the contaminated zone, dense soils, and low soil permeability.

- The source of contaminants and the transport mechanisms for continued vertical migration have been removed because Vault 630 is no longer in use and sediment and accumulated wastewater in the vault has been removed.

6.2 RECOMMENDATIONS

The Vault 630 site meets the Water Board requirements for hydrocarbons left in soil for a UST site. Therefore, no further action is required at the Vault 630 site because residual petroleum hydrocarbon contamination in soils does not present a threat to direct human contact or to groundwater. VOCs were not present at the site at levels that are a threat for vapor migration. In addition, concentrations of all other chemical compounds detected in soil were below either the established background concentrations for metals at Fort Irwin or the EPA residential PRGs for direct exposure to soil contaminants. Vault 630 should be closed in place to prevent future collection of rainwater that could act as a mechanism for leaching of the heavy-end petroleum hydrocarbons present beneath the vault farther downward.

Fort Irwin will complete an operational closure of the inactive Vault 630 described in the report. The facility where Vault 630 is located will continue as an active hazardous waste management operation. Fort Irwin plans to closure vault 630 by filling the vault with an inert material (e.g. pea gravel or concrete slurry), razing the side walls to existing concrete pad grade, and covering top of vault to grade.

REFERENCES

Densmore, J.N., and C.J Londquist. 1997. "Groundwater Hydrogeology and Water Quality of Irwin Basin at Fort Irwin National Training Center, California." Prepared for U.S. Geological Survey (USGS). *Water Resources Investigation Report 97-4092*.

Densmore, J. 2003. "Simulation of Groundwater-Flow in the Irwin Basin Aquifer System, Fort Irwin National Training Center, California." Prepared for USGS. *Water Resources Investigation Report 02-4264*.

Parsons Engineering Science, Inc. 1996. "Technical Memorandum National Training Center Fort Irwin Statistical Analysis of Background Data Fort Irwin, California." December.

Regional Water Quality Control Board – Lahontan Region (Water Board). 2004. "Fact Sheet, Petroleum Hydrocarbon Cleanup Approach or Soils." Available Online at: http://www.waterboards.ca.gov/lahontan/files/soilcufs.pdf

SCS Engineers. 1982. "As Built Drawings, Vehicle Wash Facilities, Fort Irwin, California." October 26.

Smith Environmental Technologies Corporation. 1995. "Closure Report Waste Petroleum, Oil, and Lubricant Storage Facilities Building 630." June 1.

Tetra Tech EM Inc. (Tetra Tech). 2003. Interview regarding past operation and closure of Vault 630. Between Richard Howell, Tetra Tech, and Jim Combe, Operations Manager for the Base. June 19.

Tetra Tech. 2004. "Final Work Plan, Vault 630 Site Investigation and Closure, National Training Center, Fort Irwin, California." November.

U.S. Environmental Protection Agency (EPA). 1994a. "Laboratory Data Validation Functional Guidelines for Evaluating Organics Analyses." EPA/540/R-94/082. Office of Solid Waste and Emergency Response.

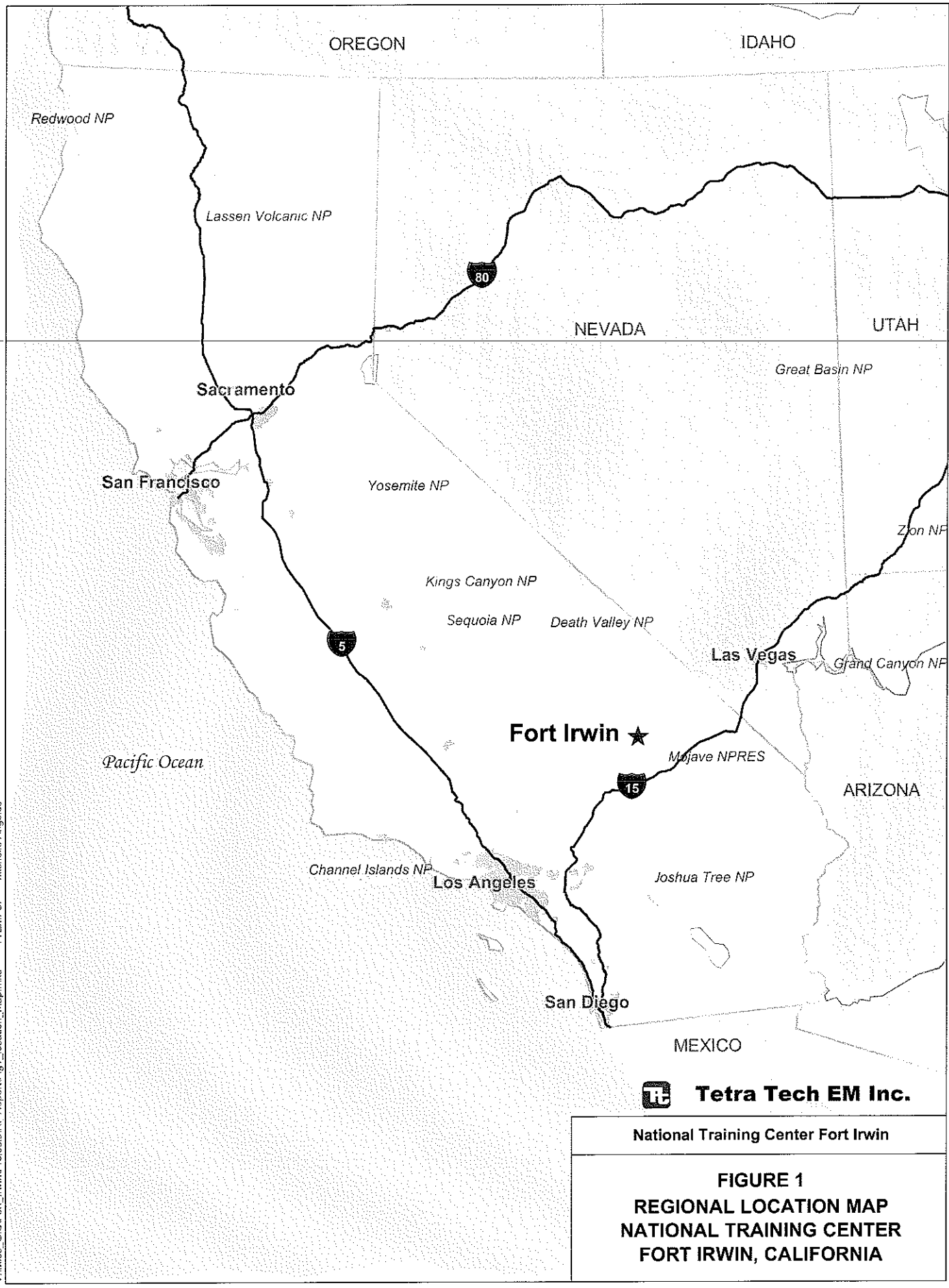
EPA. 1994b. "Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses." EPA/540/R-94/083. Office of Solid Waste and Emergency Response.

EPA. 2004 "EPA Region IX PRG Table." Available Online at: http://www.epa.gov/region09/waste/sfund/prg/files/04prgtable.pdf

U.S. Geological Survey. 2000. "Groundwater Flow Simulation of Irwin Basin Aquifer System, Fort Irwin National Training Center, California." Pre-draft Revision.

Yount, J.C., and others. 1994. "Preliminary Geologic Map of Fort Irwin Basin, North-Central Mojave Desert, California." Prepared for USGS. *Open-File Report 94-173*.

FIGURES

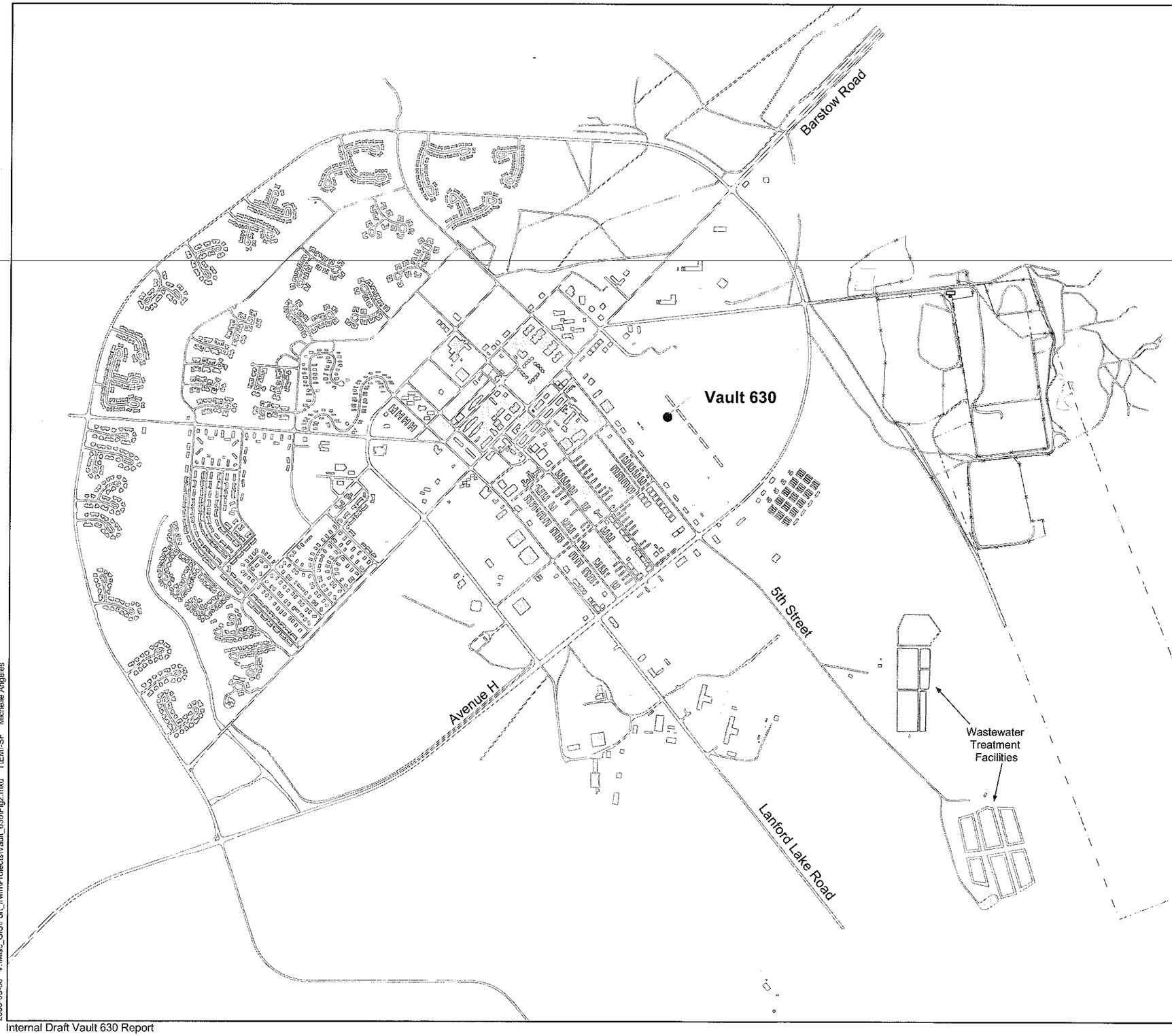


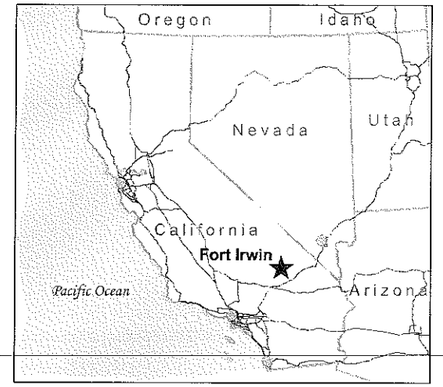
Tetra Tech EM Inc.

National Training Center Fort Irwin

FIGURE 1
REGIONAL LOCATION MAP
NATIONAL TRAINING CENTER
FORT IRWIN, CALIFORNIA

V:\Misc_GIS\Fort_Irwin\Projects\RI_Report\Fig1_location_map.mxd TTEMI-SF Michelle Angeles





FENCE

LANDFILL BOUNDARY

CANTONMENT AREA

BUILDINGS

N

1,500 0 1,500

Feet

FIGURE 2

FORT IRWIN FEATURES MAP
NATIONAL TRAINING CENTER
FORT IRWIN, CALIFORNIA

Tetra Tech EM Inc.

2005-08-30 V:\Misc_GIS\Fort_Irwin\Projects\Vault_630\Fig2.mxd TtEMI-SF Michelle Angeles

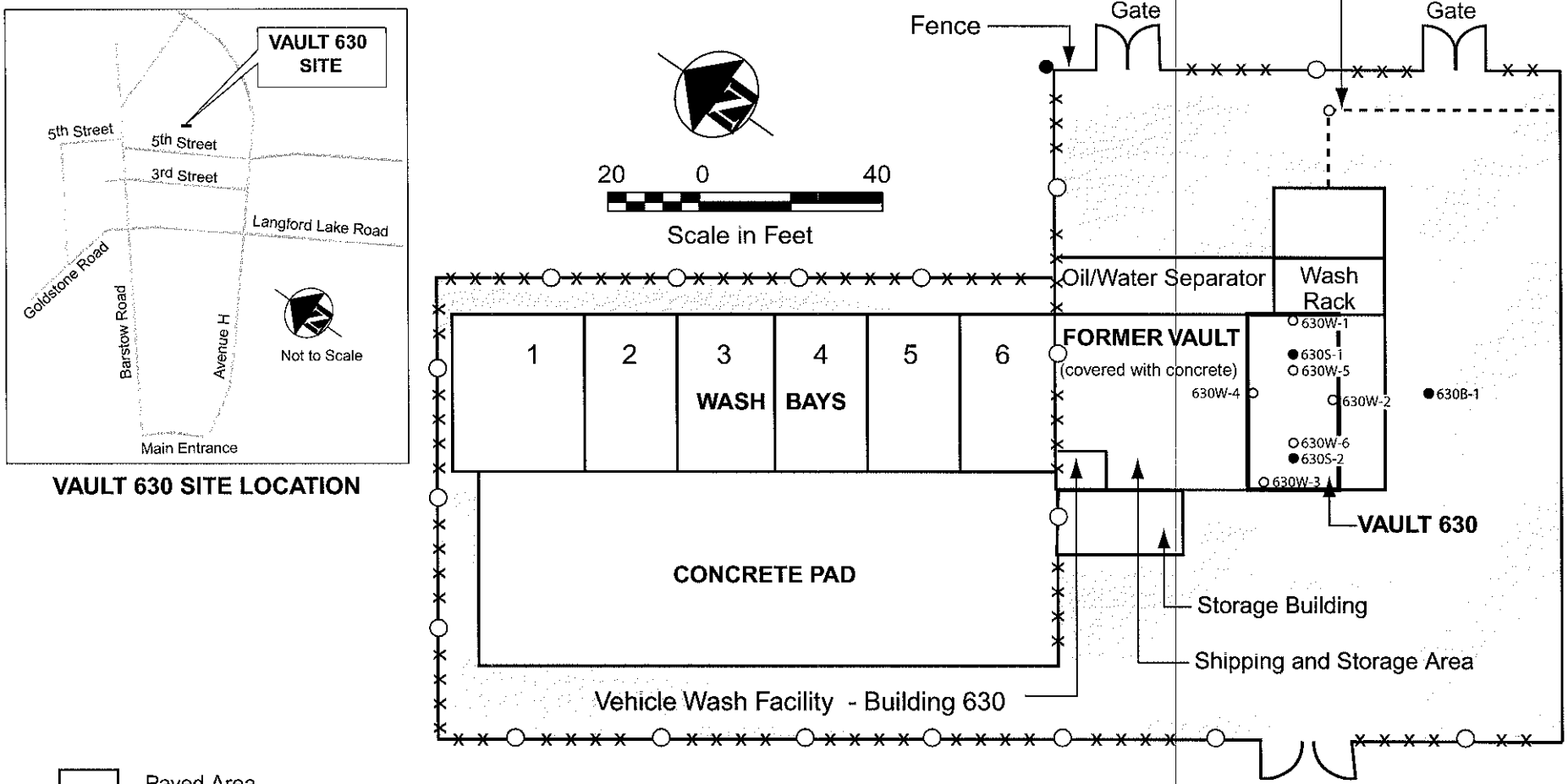
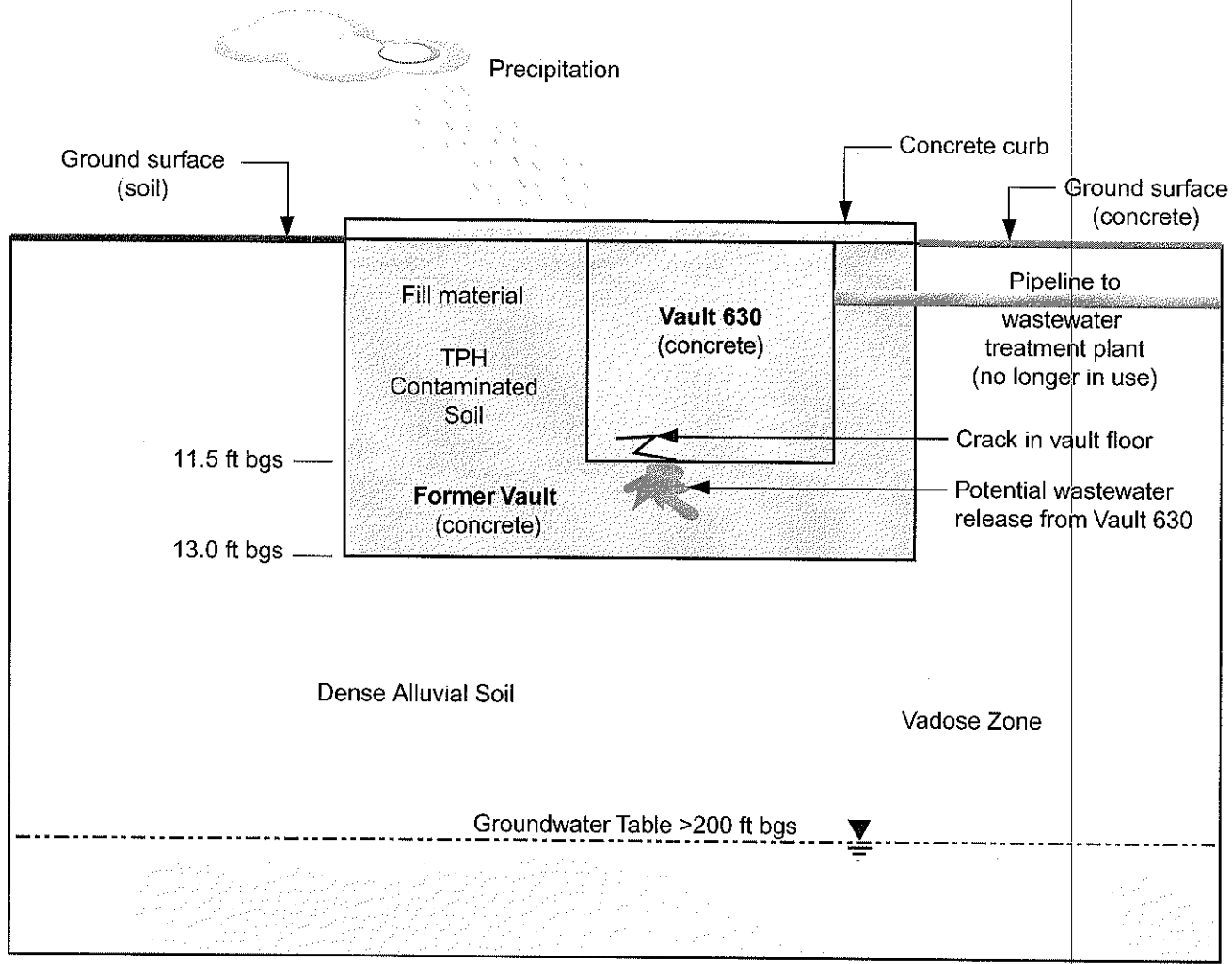


FIGURE 3

VAULT 630
DETAILED SITE LOCATION AND FEATURES MAP
NATIONAL TRAINING CENTER
FORT IRWIN, CALIFORNIA

Tetra Tech EM Inc.



Legend

- Potentiometric surface
- bgs — below ground surface
- Dense Alluvial Soil
- Former Vault
- TPH — Total Petroleum Hydrocarbons

Not to Scale

FIGURE 4

VAULT 630
CONCEPTUAL SITE MODEL
NATIONAL TRAINING CENTER
FORT IRWIN, CALIFORNIA

Tetra Tech EM Inc.

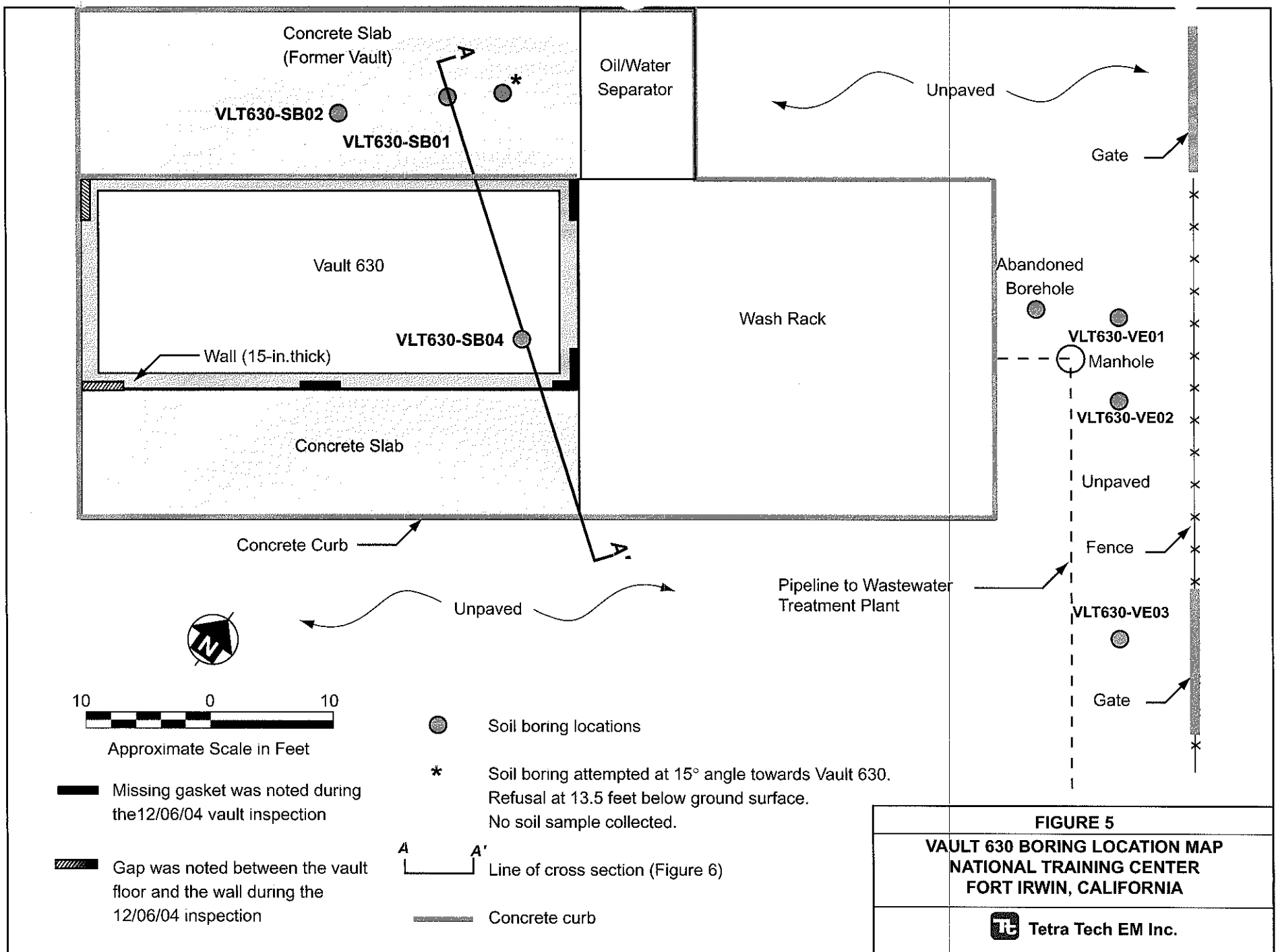


FIGURE 5

VAULT 630 BORING LOCATION MAP
NATIONAL TRAINING CENTER
FORT IRWIN, CALIFORNIA

Tetra Tech EM Inc.

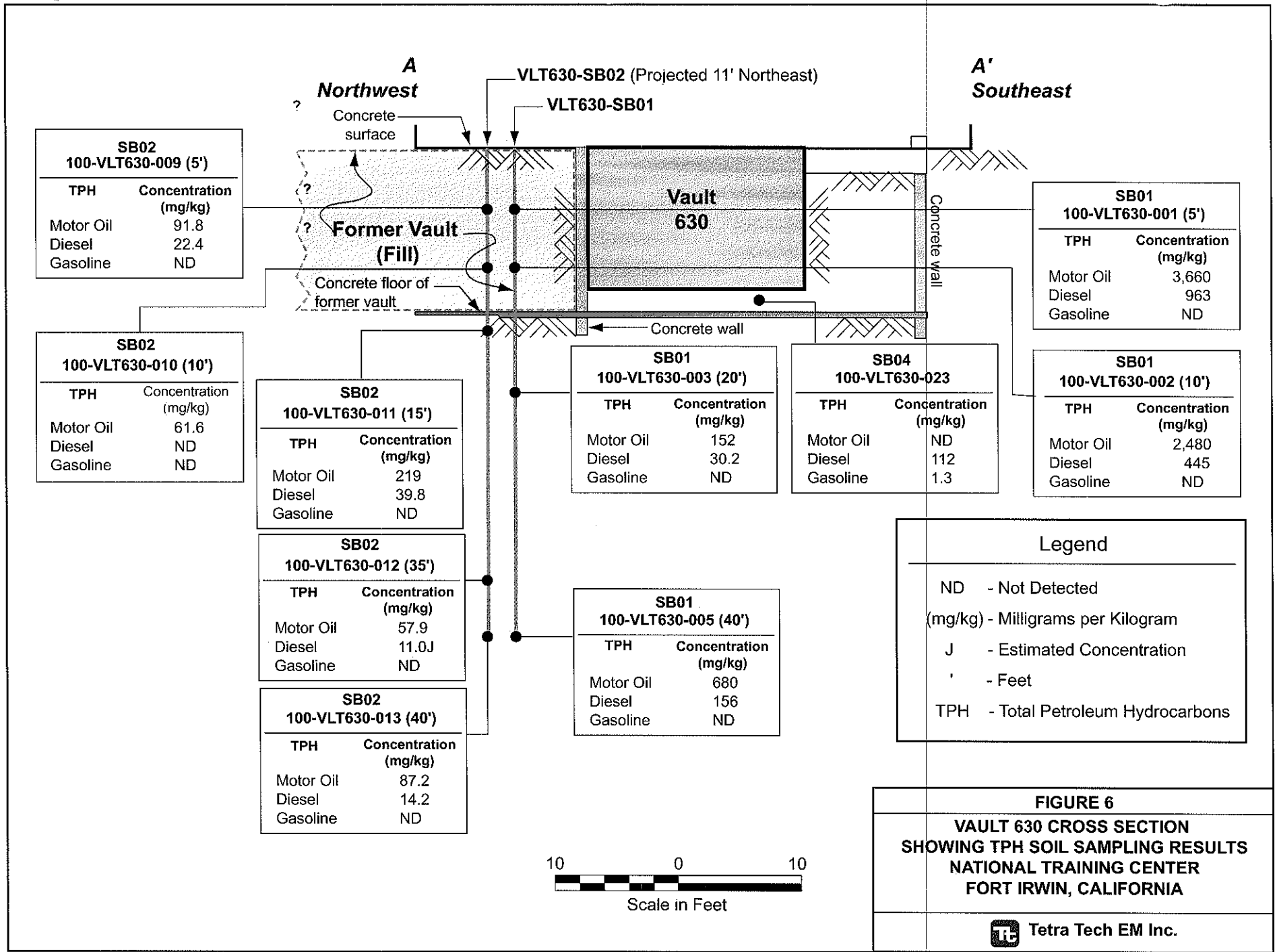


FIGURE 6

VAULT 630 CROSS SECTION SHOWING TPH SOIL SAMPLING RESULTS NATIONAL TRAINING CENTER FORT IRWIN, CALIFORNIA

Tetra Tech EM Inc.

TABLES

TABLE 1
PREVIOUS VAULT 630 SAMPLING RESULTS
VAULT 630 INVESTIGATION NATIONAL TRAINING CENTER FORT IRWIN

Parameter	Method	Unit	Wipe Sample Number						Soil Sample Number		
			630W-1	630W-2	630W-3	630W-4	630W-5	630W-6	630B-1	630S-1	630S-2
Volatile Organics	8010/8020	mg/100 cm^2	ND[1]	ND[1]	ND[1]	ND[1]	ND[1]	ND[1]	ND[3]	ND[3]	ND[3]
Total Recoverable Hydrocarbons	418.1	mg/100 cm^2 – wipe mg/kg - soil	410	420	500	480	620	860	100	ND[4]	21
Volatile Organics – TCLP Extract	1311/8240	mg/L – wipe mg/kg - soil	ND[2]	ND[2]	ND[2]	ND[2]	ND[2]	ND[2]	ND[5]	ND[5]	ND[5]
Oil and Grease	413.1	mg/kg	---	---	---	---	---	---	140	---	---
Metals											
Cadmium	6010	mg/kg	---	---	---	---	---	---	<0.5	---	---
Chromium	6010	mg/kg	---	---	---	---	---	---	10	---	---
Lead	6010	mg/kg	---	---	---	---	---	---	6.5	---	---
Zinc	6010	mg/kg	---	---	---	---	---	---	41	---	---

Notes:

1	Volatile organic minimum reporting limit range from 0.002 mg/100 cm^2 to 0.0007 mg/100 cm^2
2	Volatile organic minimum reporting limit range from 0.01 to 0.05 mg/L
3	Volatile organic, EPA method 8010/8020, minimum reporting limit range from 0.005 mg/kg to 1 mg/kg
4	Total recoverable hydrocarbon practical quantitation limit of 20 mg/kg
5	Volatile organic, EPA method 8240, minimum reporting limit range from 0.01 to 0.005 mg/kg
---	Not analyzed
ND	Not detected at the laboratory minimum reporting or practical quantitation limit
mg/100 cm^2	Milligram per 100 square centimeters
mg/kg	Milligram per kilogram
mg/L	Milligram per liter
TCLP	Toxicity characteristic leaching procedure

TABLE 2

SAMPLE ANALYSIS MATRIX
VAULT 630 INVESTIGATION
NATIONAL TRAINING CENTER FORT IRWIN

Sample Identification No.	Field Identification No.	Type	Depth (feet bgs)	Matrix	TPH-Purgeables	TPH-Extractables	VOCs	SVOCs	PCBs	Metals (CAM 17)	Total Organic Carbon	Total and Effective Soil Porosity	Moisture	Bulk Density	Permeability	TPH Fractions	Reactivity, Corrosivity, and Ignitability
100-VLT630-001	VLT630-SB01-5	Field Sample	5	Soil	X	X	X	X	X	X							
100-VLT630-002	VLT630-SB01-10	Field Sample	10	Soil	X	X	X	X	X	X							
100-VLT630-003	VLT630-SB01-20	Field Sample	20	Soil	X	X	X	X	X	X							
100-VLT630-005	VLT630-SB01-40	Field Sample	40	Soil	X	X	X	X	X	X							
100-VLT630-009	VLT630-SB02-5	Field Sample	5	Soil	X	X	X	X	X	X	X	X	X	X	X	X	
100-VLT630-010	VLT630-SB02-10	Field Sample	10	Soil	X	X	X	X	X	X							
100-VLT630-011	VLT630-SB02-15	Field Sample	15	Soil	X	X	X	X	X	X							
100-VLT630-012	VLT630-SB02-35	Field Sample	35	Soil	X	X	X	X	X	X							
100-VLT630-013	VLT630-SB02-40	Field Sample	40	Soil	X	X	X	X	X	X							
100-VLT630-023	VLT630-SB04-0*	Field Sample	0*	Soil	X	X	X	X	X	X							
100-VLT630-025	VLT630-VE01-18	Field Sample	18	Soil	X	X	X	X	X	X							
100-VLT630-026	VLT630-VE02-18	Field Sample	18	Soil	X	X	X	X	X	X							
100-VLT630-027	VLT630-VE03-18	Field Sample	18	Soil	X	X	X	X	X	X							
100-VLT630-017	Wash Water Vault	IDW Profiling	N/A	Water	X	X	X	X	X	X							
100-VLT630-018	Soil Cuttings Composite	IDW Profiling	N/A	Soil	X	X	X	X	X	X							X
100-VLT630-018	Soil Cuttings Composite	IDW Profiling	N/A	Soil	X	X	X	X	X	X							X
100-VLT630-019	Decontaminated Water	IDW Profiling	N/A	Water	X	X	X	X	X	X							
100-VLT630-020	Trip Blank 1	Field QC	N/A	Water	X		X										
100-VLT630-021	Trip Blank 2	Field QC	N/A	Water	X		X										
100-VLT630-022	Equipment Rinsate 1	Field QC	N/A	Water	X	X	X	X	X	X							
100-VLT630-028	Equipment Rinsate 2	Field QC	N/A	Water	X	X	X	X	X	X							
100-VLT630-024	Field Blank	Field QC	N/A	Water	X	X	X	X	X	X							

Notes:

*	Collected adjacent to and beneath Vault 630
bgs	below ground surface
CAM 17	California Assessment Manual 17; includes antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium, silver, thallium, vanadium, zinc
IDW	Investigation-derived waste
N/A	Not applicable
PCB	Polychlorinated biphenyl
QC	Quality control
SVOC	Semivolatile organic compound
TPH	Total petroleum hydrocarbons
VOC	Volatile organic compound
X	Analysis conducted

TABLE 3
SOIL ANALYTICAL DATA
TPH, VOCs, AND SVOCs
VAULT 630 INVESTIGATION
NATIONAL TRAINING CENTER FORT IRWIN, CALIFORNIA

Point Identification No.:	VLT630-SB01				VLT630-SB02					VLT630-SB04	VLT630-VE01	VLT630-VE02	VLT630-VE03	Soil PRG (Residential/ Industrial)[b]
Sample Identification No.:	100-VLT630-001	100-VLT630-002	100-VLT630-003	100-VLT630-005	100-VLT630-009	100-VLT630-010	100-VLT630-011	100-VLT630-012	100-VLT630-013	100-VLT630-023	100-VLT630-025	100-VLT630-026	100-VLT630-027	
Sample Depth (feet bgs):	5	10	20	40	5	10	15	35	40	0[a]	18	18	18	
TPH														
Motor Oil	3,660	2,480	152	680	91.8	61.6	219	57.9	87.2	ND	26.9	ND	ND	
Diesel Fuel	963	445	30.2	156	22.4	ND	39.8	11.0 J	14.2	112	ND	ND	7.7 J	
Gasoline	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.3 J	ND	ND	ND	NA
VOCS														
1,2-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0037 J	ND	ND	ND	NA
4-Methyl-2-Pentanone (MIBK)	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0326 J	ND	ND	ND	NA
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0109 J	ND	ND	ND	
Carbon Disulfide	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0242	ND	ND	ND	600/600
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.010 J	ND	ND	ND	NA
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0045 J	ND	ND	ND	0.64/1.4
Tetrachloroethene	0.0010 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	360/720
Toluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0463	0.00091 J	ND	ND	150/530
Xylenes (Total)	0.0032 J	ND	ND	ND	ND	0.00092 J	ND	ND	ND	0.0247	ND	0.0014 J	ND	400/400
SVOC												ND	ND	0.48/1.3
2-Methylnaphthalene	0.205 J	ND	ND	0.0824 J	ND	ND	ND	ND	ND	ND	ND		ND	520/520
4-Methylphenol	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.08	ND	ND		270/420
Fluorene	0.0422 J	ND	ND	ND	ND	ND	ND	ND	ND	NI	ND	ND	ND	
Naphthalene	0.160 J	ND	ND	ND	ND	ND	ND	ND	ND	NI	ND	ND	ND	NA
Phenanthrene	ND	ND	ND	0.0548 J	ND	ND	ND	ND	ND	N	ND	ND	ND	NA
Phenol	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.4	ND	ND	ND	2,700/26,000
Pyrene	0.110 J	ND	ND	ND	ND	ND	ND	ND	ND	[illegible]	ND	ND	ND	NA
											ND	ND	ND	18,000/100,000
														2,300/29,000

Notes:

All results in milligrams per kilogram
Bolded results represent detections or estimated concentrations
Italicized results represent concentrations that exceed the residential PRGs; no results exceeded the industrial PRGs

a Sample collected beneath Vault 630
b U S Environmental Protection Agency (EPA) 2004 EPA Region IX PRG Table Available Online at: http: www epa gov region09 waste sfund/prg files/04prgtable pdf

bgs Below ground surface
J Estimated concentration
NA Not available
ND Not detected
PRG Preliminary remediation goal
SVOC Semivolatile organic compound
TPH Total petroleum hydrocarbons
VOC Volatile organic compound

TABLE 4
SOIL ANALYTICAL DATA, METALS
VAULT 630 INVESTIGATION
NATIONAL TRAINING CENTER FORT IRWIN, CALIFORNIA

Point Identification No.:	VLT630-SB01				VLT630-SB02					VLT630-SB04	VLT630-VE01	VLT630-VE02	VLT630-VE03	Soil PRG (Residential/ Industrial)[a]	Fort Irwin Backgrond Level[b]
Sample Identification No.:	**100-VLT630-001**	**100-VLT630-002**	**100-VLT630-003**	**100-VLT630-005**	**100-VLT630-009**	**100-VLT630-010**	**100-VLT630-011**	**100-VLT630-012**	**100-VLT630-013**	**100-VLT630-023**	**100-VLT630-025**	**100-VLT630-026**	**100-VLT630-027**		
Sample Depth (feet bgs)	**5**	**10**	**20**	**40**	**5**	**10**	**15**	**35**	**40**	**0**	**18**	**18**	**18**		
Antimony	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.77 J	0.59 J	0.70 J	31/410	6.34
Arsenic	**2.6 J**	**3.9**	**2.3**	**4.6**	**3.5**	**2.5**	**2.2**	**3.0**	**2.4**	**1.7 J**	**3.0**	**3.2**	**4.9**	0.39/1.6	9.14
Barium	53.2	84.0	55.2	115	78.9	52.8	39.7	76.0	45.0	25.4	67.7	47.1	156	5,400/67,000	175
Beryllium	0.14 J	0.19 J	0.16 J	0.71	0.18 J	0.047 J	ND	0.31	0.070 J	0.079 J	ND	0.18 J	0.075 J	150/1,900	1.17
Cadmium	ND	0.13 J	ND	ND	0.13 J	ND	ND	ND	ND	ND	ND	ND	ND	37/450	0.416
~~Chromium~~	~~5.2~~	~~7.8~~	~~13.0~~	~~12.7~~	~~7.2~~	~~4.4~~	~~8.2~~	~~10.3~~	~~12.5~~	~~5.1~~	~~10.4~~	~~8.6~~	~~7.5~~	~~210/450~~	~~27.7~~
Cobalt	4.3	5.8	2.8	4.6	5.4	3.2	2.4	4.0	2.6	17.7	4.5	5.1	4.3	900/1,900	12.9
Copper	7.6 J	12.0 J	6.7 J	13.0 J	11.4 J	7.3 J	7.7 J	9.2 J	8.8 J	8.3 J	9.9	13.4	9.8	3,100/41,000	28.7
Lead	5.8 J	8.1 J	5.1 J	6.6 J	7.6 J	5.0 J	3.8 J	4.8 J	3.3 J	3.0 J	4.5	5.2	4.1	400/800	7.33
Mercury	ND	ND	ND	ND	ND	ND	0.19 J	ND	ND	ND	0.37	0.23 J	0.24	23/310	0.202
Molybdenum	ND	ND	0.64	ND	ND	0.35	0.49	0.75	1.3	1.3 J	0.72	ND	0.23	390/5,100	4.58
Nickel	7.1	10.2	4.8	9.6	8.6	5.5	4.3	8.4	5.2	4.5	7.2	7.8	6.6	1,600/20,000	29.1
Selenium	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	390/5,100	NA
Silver	ND	ND	ND	ND	ND	ND	3.6	ND	ND	2.8	ND	ND	ND	390/5,100	NA
Thallium	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.091 J	ND	ND	ND	5.2/67	1.91
Vanadium	13.1	16.6	10.0	13.9	15.6	13.4	10.3	13.5	12.9	8.6	20.0	22.1	20.3	78/1,000	97
Zinc	22.5	35.4	17.9	37.6	33.7	21.5	15.0	26.8	20.8	17.0	32.5	31.8	26.3	24,000/100,000	51

Notes:

All results in milligrams per kilogram
Bolded results exceed industrial soil PRG
Italicized results represent concentrations that exceed the residential PRGs; no results exceeded the industrial PRGs

a Values from U.S. Environmental Protection Agency (EPA). 2004. EPA Region IX PRG Table. Available Online at:http://www.epa.gov/region09/waste/sfund/prg/files/04prgtable.pdf

b Values from Parsons Engineering Science, Inc. 1996. Technical Memorandum National Training Center Fort Irwin Statistical Analysis of Background Data Fort Irwin, California. December.

bgs Below ground surface
J Estimated concentration
NA Not available
ND Not detected
PRG Preliminary remediation goal
UTL Upper tolerance limit

APPENDIX A

CONFINED SPACE ENTRY PERMIT

ATTACHMENT X: FORT IRWIN CONFINED SPACE ENTRYCHECKLIST AND PERMIT

Space ID# Location: Vault 630 Division: Permit#

Administrative

Purpose of Entry: Core concrete and use hand auger to sample at 2 locations

Type of Work: Concrete core & sampling

Name & Phone of person Authorizing Entry:

Period Covered:	Day	Month	Year	Entry Times (1)	Entry Times (2)	Exit Times (1)	Exit Times (2)	Time Permit Expires
	07	12	2004	1:15				16:15; 07 Dec 04

Known/Potential Hazards

(i.e. atmospheric, mechanical energized sources engulfment) Atm conditions could change & volatile emissions from boring

Atmospheric Testing

	Acceptable Entry Level	Pre-Entry	Follow-Up Atmospheric Testing/Time					
Percent Oxygen	19.5% to 23.5%	20.9	20.9	20.9	20.9	20.9		
Combustibles	<10% LEL	Ø	Ø	Ø	Ø/Ø.4*	Ø/10.3*		
Carbon Monoxide	35 PPM (TWA)	Ø	Ø	Ø	Ø	Ø		
Hydrogen Sulfide (H_2S)	10 ppm STEL, 15 ppm TWA	Ø	Ø	Ø	Ø	Ø		
Time Tested:		13:15	2:30	3:00	3:30	4:15		
Tested By (initials):		MTF						

Instruments	Model	Serial Number	Calibration Due
Pre-Entry: Multi Rae RAE Systems	PGM-50	095-508145	12/13/04
Follow-Up: Multi Rae RAE Systems	PGM-50	095-508145	12/13/04

Communication Procedures: Verbal, Visual, Hand/Arm Signals * PID reading - donned respirator Full Face w/ organic vapor cartridges

Rescue Procedures: Notify Ft Irwin FD 4x 3495

Requirements

	Yes	*Complete		Yes	*Complete
Safety Attendant	x	MTF	Full Body Harness w/"D" Ring	x	MTF
Communication	x	MTF	Lifeline	x	MTF
Secure Area (Post and Flag)	x	MTF	Emergency Escape Retrieval Equipment	x	MTF
Respiratory Protection			Fire Extinguisher	x	MTF
Protective Clothing	x	MTF	Explosion Proof Lighting	N	MTF
Safety Glasses/Face Shield/Goggles	x	MTF	Explosion Proof Communication Equipment	N	MTF
Hearing Protection	x	MTF	Periodic/Continuous Monitoring	x	MTF
Ventilation	x	MTF	Resuscitator/Inhalator	x	MTF
Lockout/De-energize/Tagout	N	MTF	Hot Work Permit	N	MTF
Source Lines blinded/blocked/closed	N	MTF			
Purge, Flush and Vent	N	MTF			

* Initial When Completed

Authorized Entrants (attach list if necessary):

Jose Caballero
Michael Fisher

Safety Attendants: Michael Fisher, Fernando Amburg

I have been trained on the responsibilities of Entry Supervisor. I understand my duties and responsibilities and certify that all the above conditions will be met prior to allowing entry

Printed Name: Michael Fisher
Signature: [signature] Initials: MTF

CSPM Rep Printed Name:______ Signature:______ Initials:______

Rescue: Post Fire Department4X 3495 Confined Space Program Manager: Post Safety Office 4X 5074/6982/3945

ATTACHMENT X: FORT IRWIN CONFINED SPACE ENTRYCHECKLIST AND PERMIT

Space ID# ______ Location: Vault 630 Division: ______ Permit#

Administrative

Purpose of Entry: Clean material, debris and inspect bottom of the vault for cracks

Type of Work: Pressure washing with steam pressure washer and removing material with a vacuum truck

Name & Phone of person Authorizing Entry: Michael Fraser 813-714-0730

Period Covered:	Day	Month	Year	Entry Times		Exit Times		Time Permit Expires
	06	12	2004	(1) 10:45	(2)	(1) 12:00	(2)	16:15, 06 Dec 04

Known/Potential Hazards

(i.e. atmospheric, mechanical energized sources, engulfment): Potential atmospheric changing conditions, slips, trips, & falls.

Atmospheric Testing

	Acceptable Entry Level	Pre-Entry	Follow-Up Atmospheric Testing/Time (v)	(l)	(v)	(l)	(v)	(l)
Percent Oxygen	19.5% to 23.5%	20.9	20.9	20.9	20.9	20.9		
Combustibles	<10% LEL	0	0	0	0	0		
Carbon Monoxide	35 PPM (TWA)	0	0	0	0	0		
Hydrogen Sulfide (H^2S)	10 ppm STEL, 15 ppm TWA	0	0	0	0	0		
Time Tested:		8:15 / 9:30	9:45	10:15	0	0		
Tested By (initials):		MF / MF	MF	MF	11:45	12:50		

Instruments	Model	Serial Number	Calibration Due
Pre-Entry RAE Systems Multi-Rae	PGM-50	095-508145	12/13/04
Follow-Up RAE Systems Multi-Rae	PGM-50	095-508145	12/13/04

Communication Procedures: VERBAL, NEXTEL, HAND & ARM SIGNALS

Rescue Procedures: NOTIFY FT. IRWIN FD 4X3455

Requirements

	Yes	*Complete		Yes	*Complete
Safety Attendant	X	MTF	Full Body Harness w/"D" Ring	X	MTF
Communication	X	MTF	Lifeline	X	MTF
Secure Area (Post and Flag)	X	MTF	Emergency Escape Retrieval Equipment	X	MTF
Respiratory Protection	NA	MTF	Fire Extinguisher	X	MTF
Protective Clothing	X	MTF	Explosion Proof Lighting	N	MTF
Safety Glasses/Face Shield/Goggles	X	MTF	Explosion Proof Communication Equipment	N	MTF
Hearing Protection	X	MTF	Periodic/Continuous Monitoring	X	MTF
Ventilation	X	MTF	Resuscitator/Inhalator	X	MTF
Lockout/De-energize/Tagout	N	MTF	Hot Work Permit	N	MTF
Source Lines blinded/blocked/closed	N	MTF			
Purge, Flush and Vent	N	MTF			

* Initial When Completed

Authorized Entrants (attach list if necessary):

Jose Carrasco – Gary Benedetto
Fernando Ambriz – Michael Fraser

Safety Attendants: Michael Fraser, Fernando Ambriz

I have been trained on the responsibilities of Entry Supervisor. I understand my duties and responsibilities and certify that all the above conditions will be met prior to allowing entry.

Printed Name: Michael Fraser
Signature: [signature]
Initials: MTF

CSPM Rep Printed Name: ______ Signature: ______ Initials: ______

Rescue: Post Fire Department4X 3495

Confined Space Program Manager: Post Safety Office 4X 5074/6982/3945

APPENDIX B

SOIL BORING LOGS

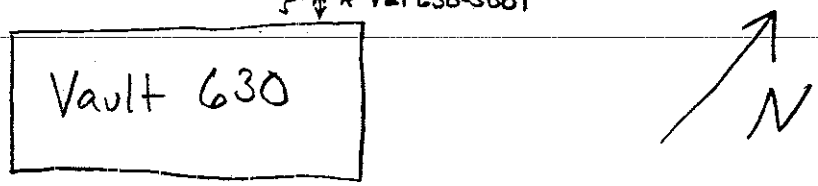
G 1058.2401.100.03

Tetra Tech EM Inc.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

DO: 100
Bldg./Site: 630 / Vault 630
Project Name: Fort Irwin Vault 630

Boring Number: VLT 630 - SB01	Date Started: 12-8-2004
Drilling Method: (*Circle one*) HSA Continuous Core/Direct-Push/Hand Auger/ Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Date Completed: 12-8-2004
	Logged By: Darren Croteau
Outer Diameter of Boring: 8"	Drilling Subcontractor: Cascade Drilling
Inner Diameter of Well Casing: NA	Driller: Ismael Esperanza
Depth to Water (feet bgs): NA	Location Sketch:



Time	Depth (feet bgs)	Drive Interval	Recovered Interval	Sample ID	Blow Count (per 6 inches) / V.B. Utility Type Diameter	Description	USCS Soil Symbol	Well Construction	OVM (ppm)
	5	5	12"		10 15 30	Sand, Light brown with gray staining 5% silt, 90% fine to medium grained sand, 5% fine gravel, petroleum odor (All) moist.	SP		5
	10	10	12"		24 50	as above,			8
	15					Concrete			
						Sand, brown 85% fine to medium sand, 10% fines, 5% fine gravel, no petroleum odor, dry	SP		0

VLT630-SB01

Tetra Tech EM Inc.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

DO: 100
Bldg./Site: Vault 630
Project Name: _____

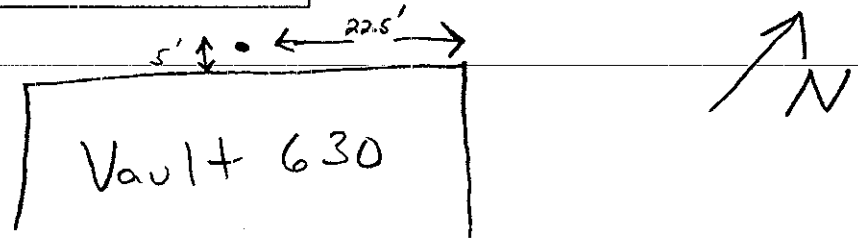
Time	Depth (feet bgs)	Drive Interval	Recovered Interval	Sample ID	Blow Count (per 6 inches) / V.B. utility type dia	Description	USCS Soil Symbol	Well Construction	OVM (ppm)
						Drilled through Concrete?			
		20	4"		50/4"	Sand, light brown, 10% fines, 90% Fine to medium sand, no odor, dry, very dense			0-0.5
		30	3"		50/3"	Silty Sand, light brown 25% fines, 75% fine grained sand, no odor, dry very dense			0.5
		40	4"		60/4"				0.1 (estimate)
		45				Bottom of Boring @ 41.5'			

Tetra Tech EM Inc.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

DO: 100
Bldg /Site: 630/Vault 630
Project Name:

Boring Number: VLT630-SB02	Date Started: 12/8/04
Drilling Method: (*Circle one*) HSA Continuous Core/Direct-Push/Hand Auger/ Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Date Completed: 12/8/04
	Logged By: Darren Croteau
Outer Diameter of Boring: 8"	Drilling Subcontractor: Cascade Drilling
Inner Diameter of Well Casing: NA	Driller: Ismael Esperanza
Depth to Water (feet bgs):	Location Sketch:



Time	Depth (feet bgs)	Drive Interval	Recovered Interval	Sample ID	Blow Count (per 6 inches) / V.B. Utility Type Diameter	Description	USCS Soil Symbol	Well Construction	OVM (ppm)
	5		12"		24 35	Sand, brown, 10% fines, 85% fine to medium sand, 5% fine gravel, no odor (fill)			3
	10		12"		25 30	Sand, as above → Driller notes gray sludge @ 13'			2
						Concrete 6"-12" approximately			
	15		3"		59 3"	Sand, brown with gray sludge, 85% fine to medium sand, 10% fines, 5% fine gravel, no odor top of sample interval wet			0

VLT630-SB02

Tetra Tech EM Inc.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

DO: _____

Bldg./Site: _____

Project Name: _____

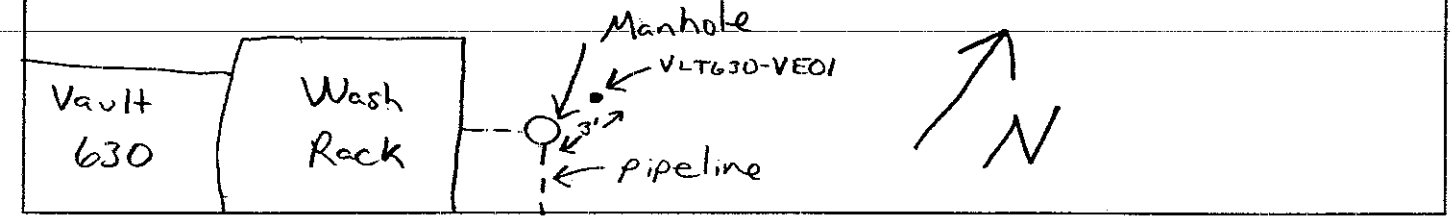
Time	Depth (feet bgs)	Drive Interval	Recovered Interval	Sample ID	Blow Count (per 6 inches) / V.B. utility type dia	Description	USCS Soil Symbol	Well Construction	OVM (ppm)
	20		6"		50 6"	Sand, brown with gray sludge, 90% fine to medium sand, 5% fines, 5% fine gravel, wet at top of sample interval.	SP		0
	25								
	30				50 4"	Sand, light brown, gray sludge present at top of interval, 90% fine sand, 10% fines, 10% medium sand, very dense, wet at top of sample interval			0
	35				50 6"	Sand, as above,			0
	40				50 6"	Bottom of Boring @ 40.5			

Tetra Tech EM Inc.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

DO: 100
Bldg./Site: Vault 630
Project Name:

Boring Number: VLT630-VE01	Date Started: 12-9-04
Drilling Method: (*Circle one*) HSA Continuous Core/Direct-Push/Hand Auger/ Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Date Completed: 12-9-04
	Logged By: Darren Croteau
Outer Diameter of Boring: 8"	Drilling Subcontractor: Cascade
Inner Diameter of Well Casing: NA	Driller: Ismael Esparanza
Depth to Water (feet bgs): NA	Location Sketch:



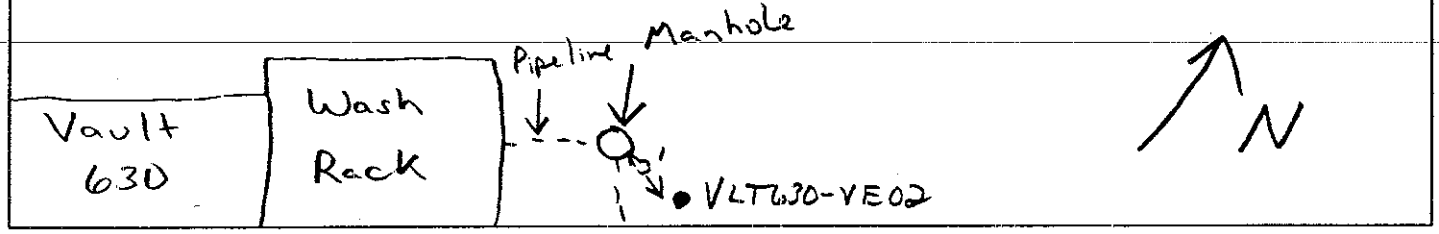
Time	Depth (feet bgs)	Drive Interval	Recovered Interval	Sample ID	Blow Count (per 6 inches) / V.B. Utility Type Diameter	Description	USCS Soil Symbol	Well Construction	OVM (ppm)
	5 10 15 16 17 18	18"	6"		6"/100	Drill to 18' to collect sample gravelly Sand, light brown 20% fine gravel, 80% fine sand, very dense, dry	SP		0
3-19.5'						Bottom of Boring @ 19.5'			

Tetra Tech EM Inc.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

DO: 100
Bldg./Site: Vault 630
Project Name:

Boring Number: VLT630-VE02	Date Started: 12/9/04
Drilling Method: (*Circle one*) HSA Continuous Core/Direct-Push/Hand Auger/ Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Date Completed: 12/9/04
	Logged By: Darren Croteau
Outer Diameter of Boring: 8"	Drilling Subcontractor: Cascade
Inner Diameter of Well Casing: NA	Driller: Ismael Esperanza
Depth to Water (feet bgs): NA	Location Sketch:



Time	Depth (feet bgs)	Drive Interval	Recovered Interval	Sample ID	Blow Count (per 6 inches) / V.B. Utility Type Diameter	Description	USCS Soil Symbol	Well Construction	OVM (ppm)
	5 10 15	18"	6"		100/6"	Drill to 18' to collect sample Gravelly sand, light brown, 20% fine gravel, 80% fine sand, very dense, dry Bottom of Boring @ 19.5'	SP		0

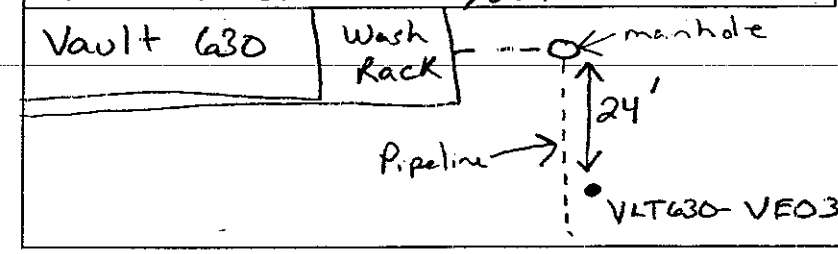
18-19.5'

Tetra Tech EM Inc.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

DO: 100
Bldg./Site: Vault 630
Project Name: Fort Erwin

Boring Number: VLT630-VE03	Date Started: 12/9/04
Drilling Method: (*Circle one*) HSA Continuous Core/Direct-Push/Hand Auger/ Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Date Completed: 12/9/04
	Logged By: Darren Croteau
Outer Diameter of Boring: 8"	Drilling Subcontractor: Cascade
Inner Diameter of Well Casing: NA	Driller: Ismael Esperanza
Depth to Water (feet bgs): NA	Location Sketch:



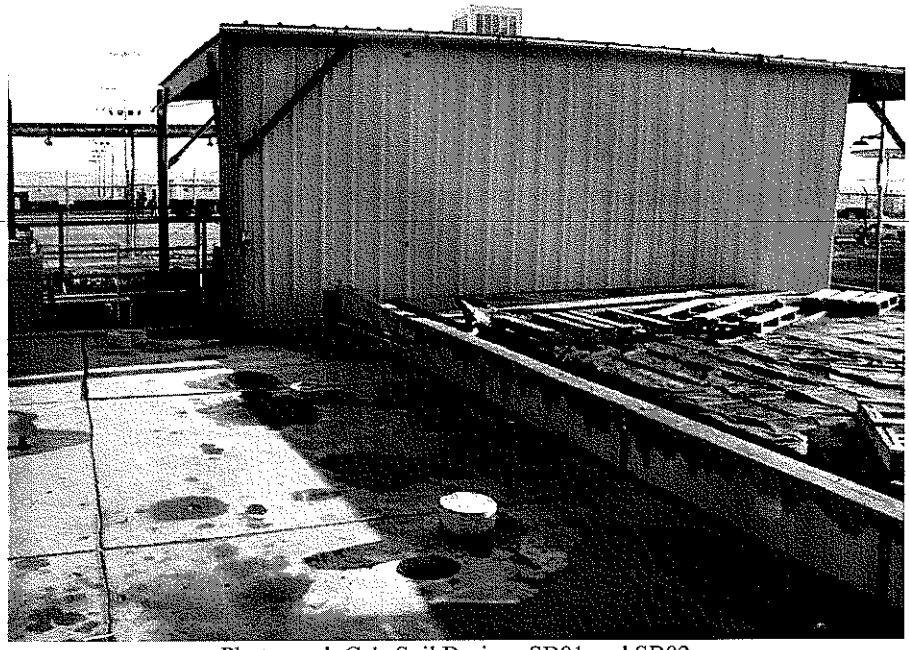
Time	Depth (feet bgs)	Drive Interval	Recovered Interval	Sample ID	Blow Count (per 6 inches) / V.B. Utility Type Diameter	Description	USCS Soil Symbol	Well Construction	OVM (ppm)
	5					Drill to 18' to collect sample			
	10								
	15								
	16								
	17	18"	6"		100/6"	Gravelly Sand, light brown 25% fine gravel, 75% fine sand, very dense, dry.	SP		0
	18								
	19								

18-19.5'

Bottom of Boring @ 19.5'

APPENDIX C
PHOTOGRAPHIC LOG FOR VAULT 630 INVESTIGATION

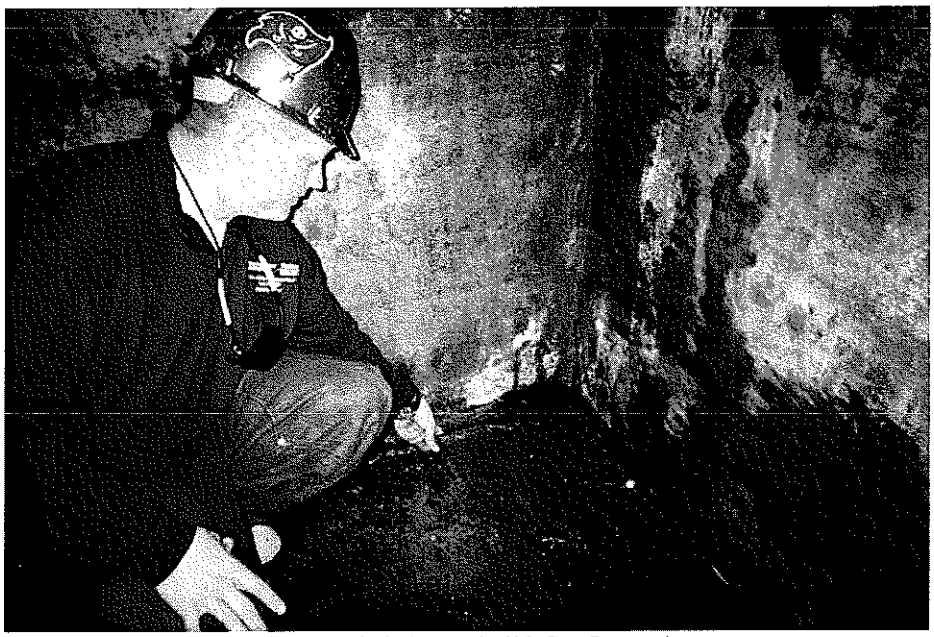
Vault 630 Investigation Photographs



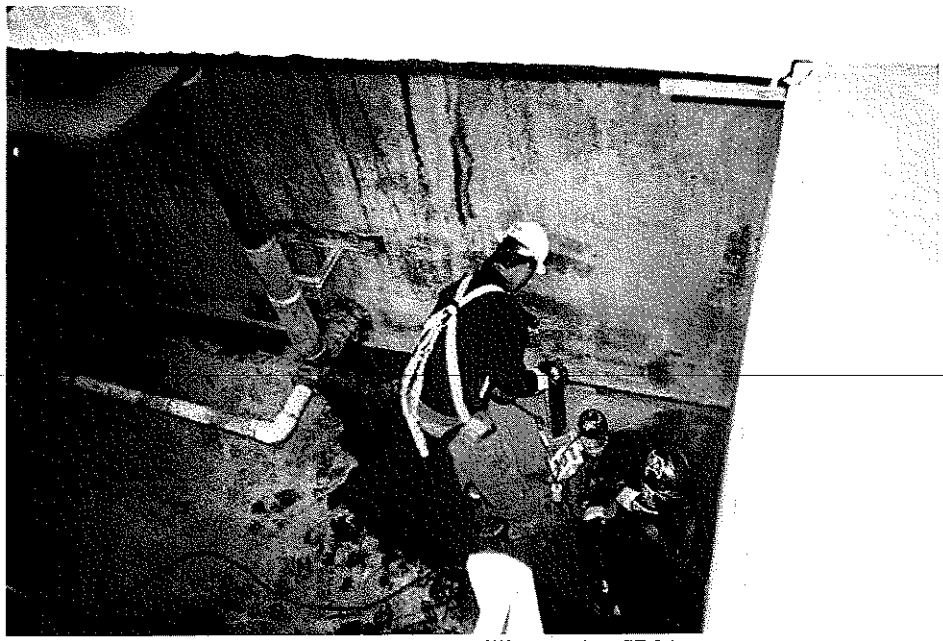
Photograph C-1: Soil Borings SB01 and SB02

Photograph C-2: Abandoned Soil Boring Along IWTP Pipeline

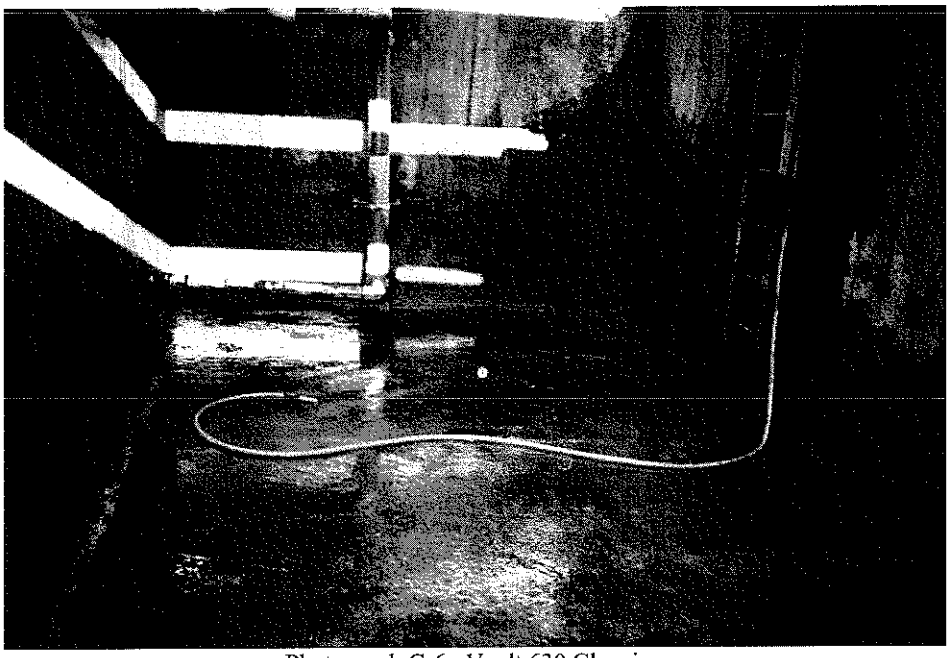
Photograph C-3: Vault 630 Gasket Inspection



Photograph C-4: Vault 630 Gap Inspection



Photograph C-5: Drilling Boring SB04



Photograph C-6: Vault 630 Cleaning

APPENDIX D

ANALYTICAL AND PHYSICAL PARAMETER DATA FOR VAULT 630 INVESTIGATION

Project : FORT IRWIN
Laboratory : Applied Physics & Chemistry Laboratory

PCB ANALYSIS

Matrix : SOIL

Date: 04/08/05

TtEMI Sample ID / Units	100-VLT630-001 (UG/KG)			100-VLT630-002 (UG/KG)			100-VLT630-003 (UG/KG)			100-VLT630-005 (UG/KG)			100-VLT630-009 (UG/KG)		
Sample Location	VLT630-SB01-5			VLT630-SB01-10			VLT630-SB01-20			VLT630-SB01-40			VLT630-SB02-5		
Sample Depth (ft)	5.00 - 5.00			10.00 - 10.00			20.00 - 20.00			40.00 - 40.00			5.00 - 5.00		
Date Sampled / SDG Number	12/08/04 IDP01			12/08/04 IDP01			12/08/04 IDP01			12/08/04 IDP01			12/08/04 IDP01		
Date Extracted / Analyzed	12/10/04 12/17/04			12/10/04 12/17/04			12/10/04 12/17/04			12/10/04 12/17/04			12/10/04 12/15/04		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
PCB-1016 (AROCLOR 1016)	36	U		38	UJ	a,b	35	UJ	a	36	UJ	a	35	U	
PCB-1221 (AROCLOR 1221)	73	U		77	UJ	a	71	UJ	a	73	UJ	a	71	U	
PCB-1232 (AROCLOR 1232)	36	U		38	UJ	a	35	UJ	a	36	UJ	a	35	U	
PCB-1242 (AROCLOR 1242)	36	U		38	UJ	a	35	UJ	a	36	UJ	a	35	U	
PCB-1248 (AROCLOR 1248)	36	U		38	UJ	a	35	UJ	a	36	UJ	a	35	U	
PCB-1254 (AROCLOR 1254)	36	U		38	UJ	a	35	UJ	a	36	UJ	a	35	U	
PCB-1260 (AROCLOR 1260)	36	U		38	UJ	a	35	UJ	a	36	UJ	a	35	U	

Validity (Val):
U - Non-detected
UJ - Non-detected estimated
R - Rejected
J - Estimated concentration

NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery exceeded
b - Lab method blank contamination
c - Calibration exceeded
d - Duplicate precision exceeded
e - MS/LCS recovery exceeded
f - Field blank contamination
g - Quantification below reporting limit
h - Holding time exceeded
i - Internal standard exceeded
j - Other qualifications
y - Resembles a fuel pattern but does not match the standards
z - Does not resemble a fuel pattern (single peaks)

Project : FORT IRWIN
Laboratory : Applied Physics & Chemistry Laboratory

PCB ANALYSIS

Matrix : SOIL

TtEMI Sample ID / Units	100-VLT630-010 (UG/KG)			100-VLT630-011 (UG/KG)			100-VLT630-012 (UG/KG)			100-VLT630-013 (UG/KG)			100-VLT630-023 (UG/KG)		
Sample Location	VLT630-SB02-10			VLT630-SB02-15			VLT630-SB02-35			VLT630-SB02-40			VLT630-SB04-0		
Sample Depth (ft)	10.00 - 10.00			15.00 - 15.00			35.00 - 35.00			40.00 - 40.00			0.00 - 0.00		
Date Sampled / SDG Number	12/08/04 IDP01			12/08/04 IDP01			12/08/04 IDP01			12/08/04 IDP01			12/07/04 IDP01		
Date Extracted / Analyzed	12/10/04 12/17/04			12/10/04 12/17/04			12/10/04 12/17/04			12/10/04 12/17/04			12/10/04 12/17/04		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
PCB-1016 (AROCLOR 1016)	36	U		37	UJ	b	36	UJ	b	38	UJ	b	39	U	
PCB-1221 (AROCLOR 1221)	73	U		74	U		73	U		76	U		77	U	
PCB-1232 (AROCLOR 1232)	36	U		37	U		36	U		38	U		39	U	
PCB-1242 (AROCLOR 1242)	36	U		37	U		36	U		38	U		39	U	
PCB-1248 (AROCLOR 1248)	36	U		37	U		36	U		38	U		39	U	
PCB-1254 (AROCLOR 1254)	36	U		37	U		36	U		38	U		39	U	
PCB-1260 (AROCLOR 1260)	36	U		37	U		36	U		38	U		39	U	

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UJ - Non-detected estimated
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J - Estimated concentration

NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery exceeded
b - Lab method blank contamination
c - Calibration exceeded
d - Duplicate precision exceeded
e - MS/LCS recovery exceeded
f - Field blank contamination
g - Quantification below reporting limit
h - Holding time exceeded
i - Internal standard exceeded
j - Other qualifications
y - Resembles a fuel pattern but does not match the standards
z - Does not resemble a fuel pattern (single peaks)

Project : FORT IRWIN
Laboratory : Applied Physics & Chemistry Laboratory

PERCENT MOISTURE ANALYSIS

Matrix : SOIL

TtEMI Sample ID / Units	100-VLT630-001 (%MST)			100-VLT630-002 (%MST)			100-VLT630-003 (%MST)			100-VLT630-005 (%MST)			100-VLT630-009 (%MST)		
Sample Location	VLT630-SB01-5			VLT630-SB01-10			VLT630-SB01-20			VLT630-SB01-40			VLT630-SB02-5		
Sample Depth (ft)	5.00 - 5.00			10.00 - 10.00			20.00 - 20.00			40.00 - 40.00			5.00 - 5.00		
Date Sampled / SDG Number	12/08/04 IDP01			12/08/04 IDP01			12/08/04 IDP01			12/08/04 IDP01			12/08/04 IDP01		
Date Extracted / Analyzed	12/09/04 12/09/04			12/09/04 12/09/04			12/09/04 12/09/04			12/09/04 12/09/04			12/09/04 12/09/04		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
MOISTURE	9.0			13.8			6.6			9.5			6.7		

TtEMI Sample ID / Units	100-VLT630-010 (%MST)			100-VLT630-011 (%MST)			100-VLT630-012 (%MST)			100-VLT630-013 (%MST)			100-VLT630-023 (%MST)		
Sample Location	VLT630-SB02-10			VLT630-SB02-15			VLT630-SB02-35			VLT630-SB02-40			VLT630-SB04-0		
Sample Depth (ft)	10.00 - 10.00			15.00 - 15.00			35.00 - 35.00			40.00 - 40.00			0.00 - 0.00		
Date Sampled / SDG Number	12/08/04 IDP01			12/08/04 IDP01			12/08/04 IDP01			12/08/04 IDP01			12/07/04 IDP01		
Date Extracted / Analyzed	12/09/04 12/09/04			12/09/04 12/09/04			12/09/04 12/09/04			12/09/04 12/09/04			12/09/04 12/09/04		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
MOISTURE	9.6			10.8			9.2			13.4			14.7		

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f - Field blank contamination
g - Quantification below reporting limit
h - Holding time exceeded
i - Internal standard exceeded
j - Other qualifications
y - Resembles a fuel pattern but does not match the standards
z - Does not resemble a fuel pattern (single peaks)

TtEMI Sample ID / Units	100-VLT630-001 ()			100-VLT630-002 ()			100-VLT630-003 ()			100-VLT630-005 ()			100-VLT630-009 ()		
Sample Location	VLT630-SB01-5			VLT630-SB01-10			VLT630-SB01-20			VLT630-SB01-40			VLT630-SB02-5		
Sample Depth (ft)	5.00 - 5.00			10.00 - 10.00			20.00 - 20.00			40.00 - 40.00			5.00 - 5.00		
Date Sampled / SDG Number	12/08/04 IDP01			12/08/04 IDP01			12/08/04 IDP01			12/08/04 IDP01			12/08/04 IDP01		
Date Extracted / Analyzed	12/10/04 12/10/04			12/10/04 12/10/04			12/10/04 12/10/04			12/10/04 12/10/04			12/10/04 12/10/04		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
PH	8.88			8.77			12.02			9.33			9.03		

TtEMI Sample ID / Units	100-VLT630-010 ()			100-VLT630-011 ()			100-VLT630-012 ()			100-VLT630-013 ()			100-VLT630-023 ()		
Sample Location	VLT630-SB02-10			VLT630-SB02-15			VLT630-SB02-35			VLT630-SB02-40			VLT630-SB04-0		
Sample Depth (ft)	10.00 - 10.00			15.00 - 15.00			35.00 - 35.00			40.00 - 40.00			0.00 - 0.00		
Date Sampled / SDG Number	12/08/04 IDP01			12/08/04 IDP01			12/08/04 IDP01			12/08/04 IDP01			12/07/04 IDP01		
Date Extracted / Analyzed	12/10/04 12/10/04			12/10/04 12/10/04			12/10/04 12/10/04			12/10/04 12/10/04			12/10/04 12/10/04		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
PH	9.30			11.34			9.52			10.17			8.50		

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TtEMI Sample ID / Units	100-VLT630-001 (UG/KG)			100-VLT630-002 (UG/KG)			100-VLT630-003 (UG/KG)			100-VLT630-005 (UG/KG)			100-VLT630-009 (UG/KG)		
Sample Location	VLT630-SB01-5			VLT630-SB01-10			VLT630-SB01-20			VLT630-SB01-40			VLT630-SB02-5		
Sample Depth (ft)	5.00 - 5.00			10.00 - 10.00			20.00 - 20.00			40.00 - 40.00			5.00 - 5.00		
Date Sampled / SDG Number	12/08/04 IDP01			12/08/04 IDP01			12/08/04 IDP01			12/08/04 IDP01			12/08/04 IDP01		
Date Extracted / Analyzed	12/14/04 12/16/04			12/14/04 12/16/04			12/14/04 12/16/04			12/14/04 12/15/04			12/14/04 12/15/04		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
1,1'-BIPHENYL	360	U		380	U		350	U		360	U		350	U	
1,2,4-TRICHLOROBENZENE	360	U		380	U		350	U		360	U		350	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	360	U		380	U		350	U		360	U		350	U	
2,4,5-TRICHLOROPHENOL	1900	U		2000	U		1800	U		1900	U		1800	U	
2,4,6-TRICHLOROPHENOL	360	U		380	U		350	U		360	U		350	U	
2,4-DICHLOROPHENOL	360	U		380	U		350	U		360	U		350	U	
2,4-DIMETHYLPHENOL	360	U		380	U		350	U		360	U		350	U	
2,4-DINITROPHENOL	3600	U		3800	U		3500	U		3600	U		3500	U	
2,4-DINITROTOLUENE	360	U		380	U		350	U		360	U		350	U	
2,6-DINITROTOLUENE	360	U		380	U		350	U		360	U		350	U	
2-CHLORONAPHTHALENE	360	U		380	U		350	U		360	U		350	U	
2-CHLOROPHENOL	360	U		380	U		350	U		360	U		350	U	
2-METHYLNAPHTHALENE	205	J	g	380	U		350	U		82.4	J	g	350	U	
2-METHYLPHENOL	360	U		380	U		350	U		360	U		350	U	
2-NITROANILINE	3600	U		3800	U		3500	U		3600	U		3500	U	
2-NITROPHENOL	360	U		380	U		350	U		360	U		350	U	
3,3'-DICHLOROBENZIDINE	1400	U		1500	U		1400	U		1400	U		1400	U	
3-NITROANILINE	3600	U		3800	U		3500	U		3600	U		3500	U	
4,6-DINITRO-2-METHYLPHENOL	3600	U		3800	U		3500	U		3600	U		3500	U	
4-BROMOPHENYL-PHENYLETHER	360	U		380	U		350	U		360	U		350	U	
4-CHLORO-3-METHYLPHENOL	360	U		380	U		350	U		360	U		350	U	
4-CHLOROANILINE	360	U		380	U		350	U		360	U		350	U	
4-CHLOROPHENYL-PHENYLETHER	360	U		380	U		350	U		360	U		350	U	
4-METHYLPHENOL	360	U		380	U		350	U		360	U		350	U	
4-NITROANILINE	1900	U		2000	U		1800	U		1900	U		1800	U	
4-NITROPHENOL	360	U		380	U		350	U		360	U		350	U	
ACENAPHTHENE	360	U		380	U		350	U		360	U		350	U	
ACENAPHTHYLENE	360	U		380	U		350	U		360	U		350	U	
ACETOPHENONE	360	U		380	U		350	U		360	U		350	U	
ANTHRACENE	360	U		380	U		350	U		360	U		350	U	
BENZO(A)ANTHRACENE	360	U		380	U		350	U		360	U		350	U	
BENZO(A)PYRENE	3600	U		380	U		350	U		360	U		350	U	
BENZO(B)FLUORANTHENE	3600	U		380	U		350	U		360	U		350	U	

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TtEMI Sample ID / Units	100-VLT630-001 (UG/KG)			100-VLT630-002 (UG/KG)			100-VLT630-003 (UG/KG)			100-VLT630-005 (UG/KG)			100-VLT630-009 (UG/KG)		
Sample Location	VLT630-SB01-5			VLT630-SB01-10			VLT630-SB01-20			VLT630-SB01-40			VLT630-SB02-5		
Sample Depth (ft)	5.00 - 5.00			10.00 - 10.00			20.00 - 20.00			40.00 - 40.00			5.00 - 5.00		
Date Sampled / SDG Number	12/08/04 IDP01			12/08/04 IDP01			12/08/04 IDP01			12/08/04 IDP01			12/08/04 IDP01		
Date Extracted / Analyzed	12/14/04 12/16/04			12/14/04 12/16/04			12/14/04 12/16/04			12/14/04 12/15/04			12/14/04 12/15/04		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
BENZO(G,H,I)PERYLENE	3600	U		380	U		350	U		360	U		350	U	
BENZO(K)FLUORANTHENE	3600	U		380	U		350	U		360	U		350	U	
BENZOIC ACID	2700	U		2900	U		2700	U		2800	U		2700	U	
BIS(2-CHLOROETHOXY)METHANE	360	U		380	U		350	U		360	U		350	U	
BIS(2-CHLOROETHYL)ETHER	360	U		380	U		350	U		360	U		350	U	
BIS(2-ETHYLHEXYL)PHTHALATE	488	U	b	380	U		350	U		360	U	b	350	U	
BUTYLBENZYLPHTHALATE	360	U		380	U		350	U		360	U		350	U	
CARBAZOLE	360	U		380	U		350	U		360	U		350	U	
CHRYSENE	360	U		380	U		350	U		360	U		350	U	
DI-N-BUTYLPHTHALATE	360	U		380	U		350	U		360	U		350	U	
DI-N-OCTYLPHTHALATE	3600	U		380	U		350	U		360	U		350	U	
DIBENZ(A,H)ANTHRACENE	3600	U		380	U		350	U		360	U		350	U	
DIBENZOFURAN	360	U		380	U		350	U		360	U		350	U	
DIETHYLPHTHALATE	360	U		380	U		350	U		360	U		350	U	
DIMETHYLPHTHALATE	360	U		380	U		350	U		360	U		350	U	
FLUORANTHENE	360	U		380	U		350	U		360	U		350	U	
FLUORENE	42.2	J	g	380	U		350	U		360	U		350	U	
HEXACHLOROBENZENE	360	U		380	U		350	U		360	U		350	U	
HEXACHLOROBUTADIENE	360	U		380	U		350	U		360	U		350	U	
HEXACHLOROCYCLOPENTADIENE	360	U		380	U		350	U		360	U		350	U	
HEXACHLOROETHANE	360	U		380	U		350	U		360	U		350	U	
INDENO(1,2,3-CD)PYRENE	3600	U		380	U		350	U		360	U		350	U	
ISOPHORONE	360	U		380	U		350	U		360	U		350	U	
N-NITROSO-DI-N-PROPYLAMINE	360	U		380	U		350	U		360	U		350	U	
N-NITROSODIPHENYLAMINE (1)	360	U		380	U		350	U		360	U		350	U	
NAPHTHALENE	160	J	g	380	U		350	U		360	U		350	U	
NITROBENZENE	360	U		380	U		350	U		360	U		350	U	
PENTACHLOROPHENOL	1900	U		2000	U		1800	U		1900	U		1800	U	
PHENANTHRENE	360	U		380	U		350	U		54.8	J	g	350	U	
PHENOL	360	U		380	U		350	U		360	U		350	U	
PYRENE	110	J	g	380	U		350	U		360	U		350	U	

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y - Resembles a fuel pattern but does not match the standards
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TtEMI Sample ID / Units	100-VLT630-010 (UG/KG)			100-VLT630-011 (UG/KG)			100-VLT630-012 (UG/KG)			100-VLT630-013 (UG/KG)			100-VLT630-023 (UG/KG)		
Sample Location	VLT630-SB02-10			VLT630-SB02-15			VLT630-SB02-35			VLT630-SB02-40			VLT630-SB04-0		
Sample Depth (ft)	10.00 - 10.00			15.00 - 15.00			35.00 - 35.00			40.00 - 40.00			0.00 - 0.00		
Date Sampled / SDG Number	12/08/04 IDP01			12/08/04 IDP01			12/08/04 IDP01			12/08/04 IDP01			12/07/04 IDP01		
Date Extracted / Analyzed	12/14/04 12/15/04			12/14/04 12/16/04			12/14/04 12/15/04			12/14/04 12/15/04			12/14/04 12/15/04		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
1,1'-BIPHENYL	360	U		370	U		360	U		380	U		390	U	
1,2,4-TRICHLOROBENZENE	360	U		370	U		360	U		380	U		390	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	360	U		370	U		360	U		380	U		390	U	
2,4,5-TRICHLOROPHENOL	1900	U		1900	U		1900	U		2000	U		2000	U	
2,4,6-TRICHLOROPHENOL	360	U		370	U		360	U		380	U		390	U	
2,4-DICHLOROPHENOL	360	U		370	U		360	U		380	U		390	U	
2,4-DIMETHYLPHENOL	360	U		370	U		360	U		380	U		390	U	
2,4-DINITROPHENOL	3600	U		3700	U		3600	U		3800	U		3900	U	
2,4-DINITROTOLUENE	360	U		370	U		360	U		380	U		390	U	
2,6-DINITROTOLUENE	360	U		370	U		360	U		380	U		390	U	
2-CHLORONAPHTHALENE	360	U		370	U		360	U		380	U		390	U	
2-CHLOROPHENOL	360	U		370	U		360	U		380	U		390	U	
2-METHYLNAPHTHALENE	360	U		370	U		360	U		380	U		390	U	
2-METHYLPHENOL	360	U		370	U		360	U		380	U		390	U	
2-NITROANILINE	3600	U		3700	U		3600	U		3800	U		3900	U	
2-NITROPHENOL	360	U		370	U		360	U		380	U		390	U	
3,3'-DICHLOROBENZIDINE	1400	U		1500	U		1400	U		1500	U		1500	U	
3-NITROANILINE	3600	U		3700	U		3600	U		3800	U		3900	U	
4,6-DINITRO-2-METHYLPHENOL	3600	U		3700	U		3600	U		3800	U		3900	U	
4-BROMOPHENYL-PHENYLETHER	360	U		370	U		360	U		380	U		390	U	
4-CHLORO-3-METHYLPHENOL	360	U		370	U		360	U		380	U		390	U	
4-CHLOROANILINE	360	U		370	U		360	U		380	U		390	U	
4-CHLOROPHENYL-PHENYLETHER	360	U		370	U		360	U		380	U		390	U	
4-METHYLPHENOL	360	U		370	U		360	U		380	U		823		
4-NITROANILINE	1900	U		1900	U		1900	U		2000	U		2000	U	
4-NITROPHENOL	360	U		370	U		360	U		380	U		390	U	
ACENAPHTHENE	360	U		370	U		360	U		380	U		390	U	
ACENAPHTHYLENE	360	U		370	U		360	U		380	U		390	U	
ACETOPHENONE	360	U		370	U		360	U		380	U		390	U	
ANTHRACENE	360	U		370	U		360	U		380	U		390	U	
BENZO(A)ANTHRACENE	360	U		370	U		360	U		380	U		390	U	
BENZO(A)PYRENE	360	U		370	U		360	U		380	U		390	U	
BENZO(B)FLUORANTHENE	360	U		370	U		360	U		380	U		390	U	

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TtEMI Sample ID / Units	100-VLT630-010 (UG/KG)			100-VLT630-011 (UG/KG)			100-VLT630-012 (UG/KG)			100-VLT630-013 (UG/KG)			100-VLT630-023 (UG/KG)		
Sample Location	VLT630-SB02-10			VLT630-SB02-15			VLT630-SB02-35			VLT630-SB02-40			VLT630-SB04-0		
Sample Depth (ft)	10.00 - 10.00			15.00 - 15.00			35.00 - 35.00			40.00 - 40.00			0.00 - 0.00		
Date Sampled / SDG Number	12/08/04 IDP01			12/08/04 IDP01			12/08/04 IDP01			12/08/04 IDP01			12/07/04 IDP01		
Date Extracted / Analyzed	12/14/04 12/15/04			12/14/04 12/16/04			12/14/04 12/15/04			12/14/04 12/15/04			12/14/04 12/15/04		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
BENZO(G,H,I)PERYLENE	360	U		370	U		360	U		380	U		390	U	
BENZO(K)FLUORANTHENE	360	U		370	U		360	U		380	U		390	U	
BENZOIC ACID	2800	U		2800	U		2800	U		2900	U		2900	U	
BIS(2-CHLOROETHOXY)METHANE	360	U		370	U		360	U		380	U		390	U	
BIS(2-CHLOROETHYL)ETHER	360	U		370	U		360	U		380	U		390	U	
BIS(2-ETHYLHEXYL)PHTHALATE	360	U		370	U		360	U		380	U		631		
BUTYLBENZYLPHTHALATE	360	U		370	U		360	U		380	U		390	U	b
CARBAZOLE	360	U		370	U		360	U		380	U		390	U	
CHRYSENE	360	U		370	U		360	U		380	U		390	U	
DI-N-BUTYLPHTHALATE	360	U		370	U		360	U		380	U		390	U	
DI-N-OCTYLPHTHALATE	360	U		370	U		360	U		380	U		390	U	
DIBENZ(A,H)ANTHRACENE	360	U		370	U		360	U		380	U		390	U	
DIBENZOFURAN	360	U		370	U		360	U		380	U		390	U	
DIETHYLPHTHALATE	360	U		370	U		360	U		380	U		390	U	
DIMETHYLPHTHALATE	360	U		370	U		360	U		380	U		390	U	
FLUORANTHENE	360	U		370	U		360	U		380	U		390	U	
FLUORENE	360	U		370	U		360	U		380	U		390	U	
HEXACHLOROBENZENE	360	U		370	U		360	U		380	U		390	U	
HEXACHLOROBUTADIENE	360	U		370	U		360	U		380	U		390	U	
HEXACHLOROCYCLOPENTADIENE	360	U		370	U		360	U		380	U		390	U	
HEXACHLOROETHANE	360	U		370	U		360	U		380	U		390	U	
INDENO(1,2,3-CD)PYRENE	360	U		370	U		360	U		380	U		390	U	
ISOPHORONE	360	U		370	U		360	U		380	U		390	U	
N-NITROSO-DI-N-PROPYLAMINE	360	U		370	U		360	U		380	U		390	U	
N-NITROSODIPHENYLAMINE (1)	360	U		370	U		360	U		380	U		390	U	
NAPHTHALENE	360	U		370	U		360	U		380	U		390	U	
NITROBENZENE	360	U		370	U		360	U		380	U		390	U	
PENTACHLOROPHENOL	1900	U		1900	U		1900	U		2000	U		2000	U	
PHENANTHRENE	360	U		370	U		360	U		380	U		390	U	
PHENOL	360	U		370	U		360	U		380	U		626		
PYRENE	360	U		370	U		360	U		380	U		390	U	

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Applicable Comments (Com):
a - Surrogate recovery exceeded
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c - Calibration exceeded
d - Duplicate precision exceeded
e - MS/LCS recovery exceeded
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g - Quantification below reporting limit
h - Holding time exceeded
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y - Resembles a fuel pattern but does not match the standards
z - Does not resemble a fuel pattern (single peaks)

TtEMI Sample ID / Units	100-VLT630-001 (MG/KG)			100-VLT630-002 (MG/KG)			100-VLT630-003 (MG/KG)			100-VLT630-005 (MG/KG)			100-VLT630-009 (MG/KG)		
Sample Location	VLT630-SB01-5			VLT630-SB01-10			VLT630-SB01-20			VLT630-SB01-40			VLT630-SB02-5		
Sample Depth (ft)	5.00 - 5.00			10.00 - 10.00			20.00 - 20.00			40.00 - 40.00			5.00 - 5.00		
Date Sampled / SDG Number	12/08/04 IDP01			12/08/04 IDP01			12/08/04 IDP01			12/08/04 IDP01			12/08/04 IDP01		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
ANTIMONY	0.25	U		0.27	U		0.25	U		0.25	U		0.25	U	
ARSENIC	2.6	J+	j	3.9			2.3			4.6			3.5		
BARIUM	53.2			84.0			55.2			115			78.9		
BERYLLIUM	0.14	J	g	0.19	J	g	0.16	J	g	0.71			0.18	J	g
CADMIUM	0.052	U	b	0.13	J	g	0.029	U	b	0.012	U		0.13	J	g
CHROMIUM	5.2			7.8			13.0			12.7			7.2		
COBALT	4.3			5.8			2.8			4.6			5.4		
COPPER	7.6	J	j	12.0	J	j	6.7	J	j	13.0	J	j	11.4	J	j
LEAD	5.8	J	j	8.1	J	j	5.1	J	j	6.6	J	j	7.6	J	j
MERCURY	0.0098	U	b	0.005	U		0.004	U		0.004	U		0.016	U	b
MOLYBDENUM	0.24	U	b	0.30	U	b	0.64			0.26	U	b	0.24	U	b
NICKEL	7.1			10.2			4.8			9.6			8.6		
SELENIUM	0.074	UJ	j	0.078	U		0.21	U	b	0.074	U		0.072	U	
SILVER	0.049	UJ	j	0.052	U		0.048	U		0.050	U		0.048	U	
THALLIUM	0.086	UJ	j	0.090	U		0.084	U		0.086	U		0.084	U	
VANADIUM	13.1			16.6			10.0			13.9			15.6		
ZINC	22.5			35.4			17.9			37.6			33.7		

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TtEMI Sample ID / Units	100-VLT630-010 (MG/KG)			100-VLT630-011 (MG/KG)			100-VLT630-012 (MG/KG)			100-VLT630-013 (MG/KG)			100-VLT630-023 (MG/KG)		
Sample Location	VLT630-SB02-10			VLT630-SB02-15			VLT630-SB02-35			VLT630-SB02-40			VLT630-SB04-0		
Sample Depth (ft)	10.00 - 10.00			15.00 - 15.00			35.00 - 35.00			40.00 - 40.00			0.00 - 0.00		
Date Sampled / SDG Number	12/08/04 IDP01			12/08/04 IDP01			12/08/04 IDP01			12/08/04 IDP01			12/07/04 IDP01		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
ANTIMONY	0.25	U		0.26	U		0.25	U		0.27	U		0.27	U	
ARSENIC	2.5			2.2			3.0			2.4			1.7	J+	j
BARIUM	52.8			39.7			76.0			45.0			25.4		
BERYLLIUM	0.047	J	g	0.016	U	b	0.31			0.070	J	g	0.079	J	g
CADMIUM	0.049	U	b	0.027	U	b	0.012	U		0.013	U		0.054	U	b
CHROMIUM	4.4			8.2			10.3			12.5			5.1		
COBALT	3.2			2.4			4.0			2.6			17.7		
COPPER	7.3	J	j	7.7	J	j	9.2	J	j	8.8	J	j	8.3	J	j
LEAD	5.0	J	j	3.8	J	j	4.8	J	j	3.3	J	j	3.0	J	j
MERCURY	0.10	U	b	0.19	J	g	0.0054	U	b	0.016	U	b	0.16	U	b
MOLYBDENUM	0.35			0.49			0.75			1.3			1.3	J+	j
NICKEL	5.5			4.3			8.4			5.2			4.5		
SELENIUM	0.074	U		0.075	U		0.074	U		0.077	U		0.079	UJ	j
SILVER	0.050	U		3.6			0.050	U		0.052	U		2.8		
THALLIUM	0.086	U		0.087	U		0.086	U		0.090	U		0.091	J+	j
VANADIUM	13.4			10.3			13.5			12.9			8.6		
ZINC	21.5			15.0			26.8			20.8			17.0		

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Applicable Comments (Com):
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TtEMI Sample ID / Units	100-VLT630-001 (MG/KG)			100-VLT630-002 (MG/KG)			100-VLT630-003 (MG/KG)			100-VLT630-005 (MG/KG)			100-VLT630-009 (MG/KG)		
Sample Location	VLT630-SB01-5			VLT630-SB01-10			VLT630-SB01-20			VLT630-SB01-40			VLT630-SB02-5		
Sample Depth (ft)	5.00 - 5.00			10.00 - 10.00			20.00 - 20.00			40.00 - 40.00			5.00 - 5.00		
Date Sampled / SDG Number	12/08/04 IDP01			12/08/04 IDP01			12/08/04 IDP01			12/08/04 IDP01			12/08/04 IDP01		
Date Extracted / Analyzed	12/10/04 12/13/04			12/10/04 12/10/04			12/10/04 12/10/04			12/10/04 12/13/04			12/10/04 12/10/04		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
MOTOR OILS	3660			2480			152			680			91.8		
PHC AS DIESEL FUEL	963			445			30.2			156			22.4		

TtEMI Sample ID / Units	100-VLT630-010 (MG/KG)			100-VLT630-011 (MG/KG)			100-VLT630-012 (MG/KG)			100-VLT630-013 (MG/KG)			100-VLT630-023 (MG/KG)		
Sample Location	VLT630-SB02-10			VLT630-SB02-15			VLT630-SB02-35			VLT630-SB02-40			VLT630-SB04-0		
Sample Depth (ft)	10.00 - 10.00			15.00 - 15.00			35.00 - 35.00			40.00 - 40.00			0.00 - 0.00		
Date Sampled / SDG Number	12/08/04 IDP01			12/08/04 IDP01			12/08/04 IDP01			12/08/04 IDP01			12/07/04 IDP01		
Date Extracted / Analyzed	12/10/04 12/10/04			12/10/04 12/10/04			12/10/04 12/10/04			12/10/04 12/10/04			12/10/04 12/11/04		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
MOTOR OILS	61.6			219			57.9			87.2			12	U	
PHC AS DIESEL FUEL	11	U		39.8			11.0	J	g	14.2			112		

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TPH PURGEABLES (GASOLINE) ANALYSIS

Matrix . SOIL

TtEMI Sample ID / Units	100-VLT630-001 (MG/KG)			100-VLT630-002 (MG/KG)			100-VLT630-003 (MG/KG)			100-VLT630-005 (MG/KG)			100-VLT630-009 (MG/KG)		
Sample Location	VLT630-SB01-5			VLT630-SB01-10			VLT630-SB01-20			VLT630-SB01-40			VLT630-SB02-5		
Sample Depth (ft)	5.00 - 5.00			10.00 - 10.00			20.00 - 20.00			40.00 - 40.00			5.00 - 5.00		
Date Sampled / SDG Number	12/08/04 IDP01			12/08/04 IDP01			12/08/04 IDP01			12/08/04 IDP01			12/08/04 IDP01		
Date Extracted / Analyzed	12/10/04 12/10/04			12/10/04 12/10/04			12/10/04 12/10/04			12/10/04 12/10/04			12/10/04 12/10/04		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
PHC AS GASOLINE	1.4	U		1.8	U		1.7	U		1.9	U		1.7	U	

TtEMI Sample ID / Units	100-VLT630-010 (MG/KG)			100-VLT630-011 (MG/KG)			100-VLT630-012 (MG/KG)			100-VLT630-013 (MG/KG)			100-VLT630-023 (MG/KG)		
Sample Location	VLT630-SB02-10			VLT630-SB02-15			VLT630-SB02-35			VLT630-SB02-40			VLT630-SB04-0		
Sample Depth (ft)	10.00 - 10.00			15.00 - 15.00			35.00 - 35.00			40.00 - 40.00			0.00 - 0.00		
Date Sampled / SDG Number	12/08/04 IDP01			12/08/04 IDP01			12/08/04 IDP01			12/08/04 IDP01			12/07/04 IDP01		
Date Extracted / Analyzed	12/10/04 12/10/04			12/10/04 12/10/04			12/10/04 12/10/04			12/10/04 12/10/04			12/10/04 12/10/04		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
PHC AS GASOLINE	1.2	U		1.7	U		1.3	U		2.2	U		1.3	J	z

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TtEMI Sample ID / Units	100-VLT630-001 (UG/KG)			100-VLT630-002 (UG/KG)			100-VLT630-003 (UG/KG)			100-VLT630-005 (UG/KG)			100-VLT630-009 (UG/KG)		
Sample Location	VLT630-SB01-5			VLT630-SB01-10			VLT630-SB01-20			VLT630-SB01-40			VLT630-SB02-5		
Sample Depth (ft)	5.00 - 5.00			10.00 - 10.00			20.00 - 20.00			40.00 - 40.00			5.00 - 5.00		
Date Sampled / SDG Number	12/08/04 IDP01			12/08/04 IDP01			12/08/04 IDP01			12/08/04 IDP01			12/08/04 IDP01		
Date Analyzed	12/10/04			12/10/04			12/10/04			12/10/04			12/10/04		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
1,1,1,2-TETRACHLOROETHANE	8.0	U		6.9	U		7.7	UJ	a	7.8	U		6.2	U	
1,1,1-TRICHLOROETHANE	8.0	U		6.9	U		7.7	UJ	a	7.8	U		6.2	U	
1,1,2,2-TETRACHLOROETHANE	8.0	U		6.9	U		7.7	UJ	a	7.8	U		6.2	U	
1,1,2-TRICHLOROETHANE	8.0	U		6.9	U		7.7	UJ	a	7.8	U		6.2	U	
1,1-DICHLOROETHANE	8.0	U		6.9	U		7.7	UJ	a	7.8	U		6.2	U	
1,1-DICHLOROETHENE	8.0	U		6.9	U		7.7	UJ	a	7.8	U		6.2	U	
1,2,3-TRICHLOROPROPANE	8.0	U		6.9	U		7.7	UJ	a	7.8	U		6.2	U	
1,2-DICHLOROBENZENE	8.0	U		6.9	U		7.7	UJ	a	7.8	U		6.2	U	
1,2-DICHLOROETHANE	8.0	U		6.9	U		7.7	UJ	a	7.8	U		6.2	U	
1,2-DICHLOROPROPANE	8.0	U		6.9	U		7.7	UJ	a	7.8	U		6.2	U	
1,3-DICHLOROBENZENE	8.0	U		6.9	U		7.7	UJ	a	7.8	U		6.2	U	
1,4-DICHLOROBENZENE	8.0	U		6.9	U		7.7	UJ	a	7.8	U		6.2	U	
2-BUTANONE (MEK)	160	U	b	140	U		150	UJ	a	160	U		120	U	
2-HEXANONE	24	U		21	U		23	UJ	a	23	U		18	U	
4-METHYL-2-PENTANONE (MIBK)	80	U		69	U		77	UJ	a	78	U		62	U	
ACETONE	80	UJ	b,c	69	UJ	c	77	UJ	a,b,c	78	UJ	c	62	UJ	c
ACRYLONITRILE	24	U		21	U		23	UJ	a	23	U		18	U	
BENZENE	8.0	U		6.9	U		7.7	UJ	a	7.8	U		6.2	U	
BROMOCHLOROMETHANE	8.0	U		6.9	U		7.7	UJ	a	7.8	U		6.2	U	
BROMODICHLOROMETHANE	8.0	U		6.9	U		7.7	UJ	a	7.8	U		6.2	U	
BROMOFORM	8.0	U		6.9	U		7.7	UJ	a	7.8	U		6.2	U	
BROMOMETHANE	8.0	U		6.9	U		7.7	UJ	a	7.8	U		6.2	U	
CARBON DISULFIDE	8.0	U		6.9	U		7.7	UJ	a	7.8	U		6.2	U	
CARBON TETRACHLORIDE	8.0	U		6.9	U		7.7	UJ	a	7.8	U		6.2	U	
CHLOROBENZENE	8.0	U		6.9	U		7.7	UJ	a	7.8	U		6.2	U	
CHLORODIBROMOMETHANE	8.0	U		6.9	U		7.7	UJ	a	7.8	U		6.2	U	
CHLOROETHANE	8.0	U		6.9	U		7.7	UJ	a	7.8	U		6.2	U	
CHLOROFORM	8.0	U		6.9	U		7.7	UJ	a	7.8	U		6.2	U	
CHLOROMETHANE	8.0	U		6.9	U		7.7	UJ	a	7.8	U		6.2	U	
CIS-1,2-DICHLOROETHENE	8.0	U		6.9	U		7.7	UJ	a	7.8	U		6.2	U	
CIS-1,3-DICHLOROPROPENE	8.0	U		6.9	U		7.7	UJ	a	7.8	U		6.2	U	
DIBROMOMETHANE	8.0	U		6.9	U		7.7	UJ	a	7.8	U		6.2	U	
DICHLORODIFLUOROMETHANE	8.0	U		6.9	U		7.7	UJ	a	7.8	U		6.2	U	

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TtEMI Sample ID / Units	100-VLT630-001 (UG/KG)			100-VLT630-002 (UG/KG)			100-VLT630-003 (UG/KG)			100-VLT630-005 (UG/KG)			100-VLT630-009 (UG/KG)		
Sample Location	VLT630-SB01-5			VLT630-SB01-10			VLT630-SB01-20			VLT630-SB01-40			VLT630-SB02-5		
Sample Depth (ft)	5.00 - 5.00			10.00 - 10.00			20.00 - 20.00			40.00 - 40.00			5.00 - 5.00		
Date Sampled / SDG Number	12/08/04 IDP01			12/08/04 IDP01			12/08/04 IDP01			12/08/04 IDP01			12/08/04 IDP01		
Date Analyzed	12/10/04			12/10/04			12/10/04			12/10/04			12/10/04		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
ETHYLBENZENE	8.0	U		6.9	U		7.7	UJ	a	7.8	U		6.2	U	
Fl13	8.0	U		6.9	U		7.7	UJ	a	7.8	U		6.2	U	
IODOMETHANE	24	U		21	U		23	UJ	a	23	U		18	U	
METHYLENE CHLORIDE	8.0	U		6.9	U		7.7	UJ	a	7.8	U		6.2	U	
STYRENE	8.0	U		6.9	U		7.7	UJ	a	7.8	U		6.2	U	
TETRACHLOROETHENE	1.0	J	g	6.9	U		7.7	UJ	a	7.8	U		6.2	U	
TOLUENE	8.0	U		6.9	U		7.7	UJ	a	7.8	U		6.2	U	
TRANS-1,2-DICHLOROETHENE	8.0	U		6.9	U		7.7	UJ	a	7.8	U		6.2	U	
TRANS-1,3-DICHLOROPROPENE	8.0	U		6.9	U		7.7	UJ	a	7.8	U		6.2	U	
TRANS-1,4-DICHLORO-2BUTENE	24	U		21	U		23	UJ	a	23	U		18	U	
TRICHLOROETHENE	8.0	U		6.9	U		7.7	UJ	a	7.8	U		6.2	U	
TRICHLOROFLUOROMETHANE	8.0	U		6.9	U		7.7	UJ	a	7.8	U		6.2	U	
VINYL ACETATE	24	U		21	U		23	UJ	a	23	U		18	U	
VINYL CHLORIDE	8.0	U		6.9	U		7.7	UJ	a	7.8	U		6.2	U	
XYLENES (TOTAL)	3.2	J	g	21	U		23	UJ	a	23	U		18	U	

Validity (Val):
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J - Estimated concentration

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Applicable Comments (Com):
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e - MS/LCS recovery exceeded
f - Field blank contamination
g - Quantification below reporting limit
h - Holding time exceeded
i - Internal standard exceeded
j - Other qualifications
y - Resembles a fuel pattern but does not match the standards
z - Does not resemble a fuel pattern (single peaks)

TtEMI Sample ID / Units	100-VLT630-010 (UG/KG)			100-VLT630-011 (UG/KG)			100-VLT630-012 (UG/KG)			100-VLT630-013 (UG/KG)			100-VLT630-023 (UG/KG)		
Sample Location	VLT630-SB02-10			VLT630-SB02-15			VLT630-SB02-35			VLT630-SB02-40			VLT630-SB04-0		
Sample Depth (ft)	10.00 - 10.00			15.00 - 15.00			35.00 - 35.00			40.00 - 40.00			0.00 - 0.00		
Date Sampled / SDG Number	12/08/04 IDP01			12/08/04 IDP01			12/08/04 IDP01			12/08/04 IDP01			12/07/04 IDP01		
Date Analyzed	12/10/04			12/10/04			12/10/04			12/10/04			12/10/04		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
1,1,1,2-TETRACHLOROETHANE	5.7	U		7.6	U		5.9	U		7.6	U		17	U	
1,1,1-TRICHLOROETHANE	5.7	U		7.6	U		5.9	U		7.6	U		17	U	
1,1,2,2-TETRACHLOROETHANE	5.7	U		7.6	U		5.9	U		7.6	U		17	U	
1,1,2-TRICHLOROETHANE	5.7	U		7.6	U		5.9	U		7.6	U		17	U	
1,1-DICHLOROETHANE	5.7	U		7.6	U		5.9	U		7.6	U		17	U	
1,1-DICHLOROETHENE	5.7	U		7.6	U		5.9	U		7.6	U		17	U	
1,2,3-TRICHLOROPROPANE	5.7	U		7.6	U		5.9	U		7.6	U		17	U	
1,2-DICHLOROBENZENE	5.7	U		7.6	U		5.9	U		7.6	U		3.7	J	g
1,2-DICHLOROETHANE	5.7	U		7.6	U		5.9	U		7.6	U		17	U	
1,2-DICHLOROPROPANE	5.7	U		7.6	U		5.9	U		7.6	U		17	U	
1,3-DICHLOROBENZENE	5.7	U		7.6	U		5.9	U		7.6	U		17	U	
1,4-DICHLOROBENZENE	5.7	U		7.6	U		5.9	U		7.6	U		17	U	
2-BUTANONE (MEK)	110	U	b	150	U		120	U		150	U		341	U	b
2-HEXANONE	17	U		23	U		18	U		23	U		51	U	
4-METHYL-2-PENTANONE (MIBK)	57	U		76	U		59	U		76	U		32.6	J	g
ACETONE	57	UJ	b,c	76	UJ	c	59	UJ	b,c	76	UJ	c	801	UJ	b,c
ACRYLONITRILE	17	U		23	U		18	U		23	U		51	U	
BENZENE	5.7	U		7.6	U		5.9	U		7.6	U		10.9	J	g
BROMOCHLOROMETHANE	5.7	U		7.6	U		5.9	U		7.6	U		17	U	
BROMODICHLOROMETHANE	5.7	U		7.6	U		5.9	U		7.6	U		17	U	
BROMOFORM	5.7	U		7.6	U		5.9	U		7.6	U		17	U	
BROMOMETHANE	5.7	U		7.6	U		5.9	U		7.6	U		17	U	
CARBON DISULFIDE	5.7	U		7.6	U		5.9	U		7.6	U		24.2		
CARBON TETRACHLORIDE	5.7	U		7.6	U		5.9	U		7.6	U		17	U	
CHLOROBENZENE	5.7	U		7.6	U		5.9	U		7.6	U		10	J	g
CHLORODIBROMOMETHANE	5.7	U		7.6	U		5.9	U		7.6	U		17	U	
CHLOROETHANE	5.7	U		7.6	U		5.9	U		7.6	U		17	U	
CHLOROFORM	5.7	U		7.6	U		5.9	U		7.6	U		17	U	
CHLOROMETHANE	5.7	U		7.6	U		5.9	U		7.6	U		17	U	
CIS-1,2-DICHLOROETHENE	5.7	U		7.6	U		5.9	U		7.6	U		17	U	
CIS-1,3-DICHLOROPROPENE	5.7	U		7.6	U		5.9	U		7.6	U		17	U	
DIBROMOMETHANE	5.7	U		7.6	U		5.9	U		7.6	U		17	U	
DICHLORODIFLUOROMETHANE	5.7	U		7.6	U		5.9	U		7.6	U		17	U	

Validity (Val):
U - Non-detected
UJ - Non-detected estimated
R - Rejected
J - Estimated concentration

NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery exceeded
b - Lab method blank contamination
c - Calibration exceeded
d - Duplicate precision exceeded
e - MS/LCS recovery exceeded
f - Field blank contamination
g - Quantification below reporting limit
h - Holding time exceeded
i - Internal standard exceeded
j - Other qualifications
y - Resembles a fuel pattern but does not match the standards
z - Does not resemble a fuel pattern (single peaks)

TtEMI Sample ID / Units	100-VLT630-010 (UG/KG)			100-VLT630-011 (UG/KG)			100-VLT630-012 (UG/KG)			100-VLT630-013 (UG/KG)			100-VLT630-023 (UG/KG)		
Sample Location	VLT630-SB02-10			VLT630-SB02-15			VLT630-SB02-35			VLT630-SB02-40			VLT630-SB04-0		
Sample Depth (ft)	10.00 - 10.00			15.00 - 15.00			35.00 - 35.00			40.00 - 40.00			0.00 - 0.00		
Date Sampled / SDG Number	12/08/04 IDP01			12/08/04 IDP01			12/08/04 IDP01			12/08/04 IDP01			12/07/04 IDP01		
Date Analyzed	12/10/04			12/10/04			12/10/04			12/10/04			12/10/04		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
ETHYLBENZENE	5.7	U		7.6	U		5.9	U		7.6	U		4.5	J	g
F113	5.7	U		7.6	U		5.9	U		7.6	U		17	U	
IODOMETHANE	17	U		23	U		18	U		23	U		51	U	
METHYLENE CHLORIDE	5.7	U		7.6	U		5.9	U		7.6	U		17	U	
STYRENE	5.7	U		7.6	U		5.9	U		7.6	U		17	U	
TETRACHLOROETHENE	5.7	U		7.6	U		5.9	U		7.6	U		17	U	
TOLUENE	5.7	U		7.6	U		5.9	U		7.6	U		46.3		
TRANS-1,2-DICHLOROETHENE	5.7	U		7.6	U		5.9	U		7.6	U		17	U	
TRANS-1,3-DICHLOROPROPENE	5.7	U		7.6	U		5.9	U		7.6	U		17	U	
TRANS-1,4-DICHLORO-2BUTENE	17	U		23	U		18	U		23	U		51	U	
TRICHLOROETHENE	5.7	U		7.6	U		5.9	U		7.6	U		17	U	
TRICHLOROFLUOROMETHANE	5.7	U		7.6	U		5.9	U		7.6	U		17	U	
VINYL ACETATE	17	U		23	U		18	U		23	U		51	U	
VINYL CHLORIDE	5.7	U		7.6	U		5.9	U		7.6	U		17	U	
XYLENES (TOTAL)	0.92	J	g	23	U		18	U		23	U		24.7	J	g

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e - MS/LCS recovery exceeded
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z - Does not resemble a fuel pattern (single peaks)

Project : FORT IRWIN
Laboratory : Applied Physics & Chemistry Laboratory

PCB ANALYSIS

Matrix : WATER

TtEMI Sample ID / Units	100-VLT630-017 (UG/L)			100-VLT630-022 (UG/L)		
Sample Location	WASH WATER VAULT			EQUIPMENT RINSATE 1		
Sample Depth (ft)	0.00 - 0.00			0.00 - 0.00		
Date Sampled / SDG Number	12/06/04 IDP01			12/07/04 IDP01		
Date Extracted / Analyzed	12/14/04 12/16/04			12/14/04 12/16/04		
Analyte	Result	Val	Com	Result	Val	Com
PCB-1016 (AROCLOR 1016)	0.96	UJ	j,n	0.96	UJ	j
PCB-1221 (AROCLOR 1221)	1.9	UJ	h	1.9	U	
PCB-1232 (AROCLOR 1232)	0.96	UJ	h	0.96	U	
PCB-1242 (AROCLOR 1242)	0.96	UJ	h	0.96	U	
PCB-1248 (AROCLOR 1248)	0.96	UJ	h	0.96	U	
PCB-1254 (AROCLOR 1254)	0.96	UJ	h	0.96	U	
PCB-1260 (AROCLOR 1260)	0.96	UJ	h	4.1		

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b - Lab method blank contamination
c - Calibration exceeded
d - Duplicate precision exceeded
e - MS/LCS recovery exceeded
f - Field blank contamination
g - Quantification below reporting limit
h - Holding time exceeded
i - Internal standard exceeded
j - Other qualifications
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z - Does not resemble a fuel pattern (single peaks)

TtEMI Sample ID / Units	100-VLT630-017 (UG/L)			100-VLT630-022 (UG/L)		
Sample Location	WASH WATER VAULT			EQUIPMENT RINSATE 1		
Sample Depth (ft)	0.00 - 0.00			0.00 - 0.00		
Date Sampled / SDG Number	12/06/04 IDP01			12/07/04 IDP01		
Date Extracted / Analyzed	12/13/04 12/17/04			12/13/04 12/17/04		
Analyte	Result	Val	Com	Result	Val	Com
1,1'-BIPHENYL	9.6	U		9.6	U	
1,2,4-TRICHLOROBENZENE	9.6	U		9.6	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	9.6	U		9.6	U	
2,4,5-TRICHLOROPHENOL	48	U		48	U	
2,4,6-TRICHLOROPHENOL	48	U		48	U	
2,4-DICHLOROPHENOL	9.6	U		9.6	U	
2,4-DIMETHYLPHENOL	9.6	U		9.6	U	
2,4-DINITROPHENOL	48	UJ	c	48	U	
2,4-DINITROTOLUENE	9.6	U		9.6	U	
2,6-DINITROTOLUENE	9.6	U		9.6	U	
2-CHLORONAPHTHALENE	9.6	U		9.6	U	
2-CHLOROPHENOL	9.6	U		9.6	U	
2-METHYLNAPHTHALENE	9.6	U		9.6	U	
2-METHYLPHENOL	9.6	U		9.6	U	
2-NITROANILINE	48	U		48	U	
2-NITROPHENOL	9.6	U		9.6	U	
3,3'-DICHLOROBENZIDINE	19	U		19	U	
3-NITROANILINE	48	U		48	U	
4,6-DINITRO-2-METHYLPHENOL	48	U		48	U	
4-BROMOPHENYL-PHENYLETHER	9.6	U		9.6	U	
4-CHLORO-3-METHYLPHENOL	9.6	U		9.6	U	
4-CHLOROANILINE	9.6	U		9.6	U	
4-CHLOROPHENYL-PHENYLETHER	9.6	U		9.6	U	
4-METHYLPHENOL	9.6	U		9.6	U	
4-NITROANILINE	48	U		48	U	
4-NITROPHENOL	48	U		48	U	
ACENAPHTHENE	9.6	U		9.6	U	
ACENAPHTHYLENE	9.6	U		9.6	U	
ACETOPHENONE	9.6	U		9.6	U	
ANTHRACENE	9.6	U		9.6	U	
BENZO(A)ANTHRACENE	9.6	U		9.6	U	
BENZO(A)PYRENE	9.6	UJ	i	9.6	U	
BENZO(B)FLUORANTHENE	9.6	UJ	i	9.6	U	

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TtEMI Sample ID / Units	100-VLT630-017 (UG/L)			100-VLT630-022 (UG/L)		
Sample Location	WASH WATER VAULT			EQUIPMENT RINSATE 1		
Sample Depth (ft)	0.00 - 0.00			0.00 - 0.00		
Date Sampled / SDG Number	12/06/04 IDP01			12/07/04 IDP01		
Date Extracted / Analyzed	12/13/04 12/17/04			12/13/04 12/17/04		
Analyte	Result	Val	Com	Result	Val	Com
BENZO(G,H,I)PERYLENE	9.6	UJ	i	9.6	U	
BENZO(K)FLUORANTHENE	9.6	UJ	i	9.6	U	
BENZOIC ACID	48	U		48	U	
BIS(2-CHLOROETHOXY)METHANE	9.6	U		9.6	U	
BIS(2-CHLOROETHYL)ETHER	9.6	U		9.6	U	
BIS(2-ETHYLHEXYL)PHTHALATE	31.2	U	b	9.6	U	
BUTYLBENZYLPHTHALATE	9.6	U		9.6	U	
CARBAZOLE	9.6	U		9.6	U	
CHRYSENE	9.6	U		9.6	U	
DI-N-BUTYLPHTHALATE	9.6	U		9.6	U	
DI-N-OCTYLPHTHALATE	9.6	UJ	i	9.6	U	
DIBENZ(A,H)ANTHRACENE	9.6	UJ	i	9.6	U	
DIBENZOFURAN	9.6	U		9.6	U	
DIETHYLPHTHALATE	9.6	U		9.6	U	
DIMETHYLPHTHALATE	9.6	U		9.6	U	
FLUORANTHENE	9.6	U		9.6	U	
FLUORENE	9.6	U		9.6	U	
HEXACHLOROBENZENE	9.6	U		9.6	U	
HEXACHLOROBUTADIENE	9.6	U		9.6	U	
HEXACHLOROCYCLOPENTADIENE	9.6	U		9.6	U	
HEXACHLOROETHANE	9.6	U		9.6	U	
INDENO(1,2,3-CD)PYRENE	9.6	UJ	i	9.6	U	
ISOPHORONE	9.6	U		9.6	U	
N-NITROSO-DI-N-PROPYLAMINE	9.6	U		9.6	U	
N-NITROSODIPHENYLAMINE (1)	9.6	U		9.6	U	
NAPHTHALENE	9.6	U		9.6	U	
NITROBENZENE	9.6	U		9.6	U	
PENTACHLOROPHENOL	29	U		29	U	
PHENANTHRENE	9.6	U		9.6	U	
PHENOL	9.6	U		9.6	U	
PYRENE	9.6	U		9.6	U	

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UJ - Non-detected estimated
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J - Estimated concentration

NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery exceeded
b - Lab method blank contamination
c - Calibration exceeded
d - Duplicate precision exceeded
e - MS/LCS recovery exceeded
f - Field blank contamination
g - Quantification below reporting limit
h - Holding time exceeded
i - Internal standard exceeded
j - Other qualifications
y - Resembles a fuel pattern but does not match the standards
z - Does not resemble a fuel pattern (single peaks)

Project : FORT IRWIN
Laboratory : Applied Physics & Chemistry Laboratory

Matrix : WATER

TtEMI Sample ID / Units	100-VLT630-017 (UG/L)			100-VLT630-022 (UG/L)		
Sample Location	WASH WATER VAULT			EQUIPMENT RINSATE 1		
Sample Depth (ft)	0.00 - 0.00			0.00 - 0.00		
Date Sampled / SDG Number	12/06/04 IDP01			12/07/04 IDP01		
Analyte	Result	Val	Com	Result	Val	Com
ANTIMONY	14.5			3.9	U	
ARSENIC	22.0			2.0	U	b
BARIUM	203			1.3	U	
BERYLLIUM	0.097	U		0.097	U	
CADMIUM	6.9			0.24	U	
CHROMIUM	15.0			2.1	U	
COBALT	11.8			0.97	U	
COPPER	44.3			3.4	U	
LEAD	45.5			1.0	U	
MERCURY	0.44	J	g	0.43	J	g
MOLYBDENUM	108			0.52	U	
NICKEL	21.1			2.3	U	
SELENIUM	5.2	U	b	4.0	U	b
SILVER	1.5	U	b	0.66	U	
THALLIUM	2.0	U	b	1.4	U	
VANADIUM	35.4			0.87	U	b
ZINC	1530			2.8	U	

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Applicable Comments (Com):
a - Surrogate recovery exceeded
b - Lab method blank contamination
c - Calibration exceeded
d - Duplicate precision exceeded
e - MS/LCS recovery exceeded
f - Field blank contamination
g - Quantification below reporting limit
h - Holding time exceeded
i - Internal standard exceeded
j - Other qualifications
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z - Does not resemble a fuel pattern (single peaks)

TPH EXTRACTABLES (DIESEL) ANALYSIS

Project : FORT IRWIN
Laboratory : Applied Physics & Chemistry Laboratory

Matrix : WATER

TtEMI Sample ID / Units	100-VLT630-017 (MG/L)			100-VLT630-022 (MG/L)		
Sample Location	WASH WATER VAULT			EQUIPMENT RINSATE 1		
Sample Depth (ft)	0.00 - 0.00			0.00 - 0.00		
Date Sampled / SDG Number	12/06/04 IDP01			12/07/04 IDP01		
Date Extracted / Analyzed	12/13/04 12/14/04			12/13/04 12/14/04		
Analyte	Result	Val	Com	Result	Val	Com
MOTOR OILS	26.1			0.48	U	
PHC AS DIESEL FUEL	4.8	U		0.48	U	

Validity (Val):
U - Non-detected
UJ - Non-detected estimated
R - Rejected
J - Estimated concentration

NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery exceeded
b - Lab method blank contamination
c - Calibration exceeded
d - Duplicate precision exceeded
e - MS/LCS recovery exceeded
f - Field blank contamination
g - Quantification below reporting limit
h - Holding time exceeded
i - Internal standard exceeded
j - Other qualifications
y - Resembles a fuel pattern but does not match the standards
z - Does not resemble a fuel pattern (single peaks)

Note :

TPH PURGEABLES (GASOLINE) ANALYSIS

Project : FORT IRWIN
Laboratory : Applied Physics & Chemistry Laboratory

Matrix : WATER

TtEMI Sample ID / Units	100-VLT630-017 (MG/L)			100-VLT630-020 (MG/L)			100-VLT630-022 (MG/L)		
Sample Location	WASH WATER VAULT			TRIB BLANK 1			EQUIPMENT RINSATE 1		
Sample Depth (ft)	0.00 - 0.00			0.00 - 0.00			0.00 - 0.00		
Date Sampled / SDG Number	12/06/04 IDP01			12/07/04 IDP01			12/07/04 IDP01		
Date Extracted / Analyzed	12/10/04 12/10/04			12/10/04 12/10/04			12/10/04 12/10/04		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com
PHC AS GASOLINE	0.033	J	g,z	0.05	U		0.05	U	

Validity (Val):
U - Non-detected
UJ - Non-detected estimated
R - Rejected
J - Estimated concentration

NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery exceeded
b - Lab method blank contamination
c - Calibration exceeded
d - Duplicate precision exceeded
e - MS/LCS recovery exceeded
f - Field blank contamination
g - Quantification below reporting limit
h - Holding time exceeded
i - Internal standard exceeded
j - Other qualifications
y - Resembles a fuel pattern but does not match the standards
z - Does not resemble a fuel pattern (single peaks)

Note :

TtEMI Sample ID / Units	100-VLT630-017 (UG/L)			100-VLT630-020 (UG/L)			100-VLT630-022 (UG/L)		
Sample Location	WASH WATER VAULT			TRIB BLANK 1			EQUIPMENT RINSATE 1		
Sample Depth (ft)	0.00 - 0.00			0.00 - 0.00			0.00 - 0.00		
Date Sampled / SDG Number	12/06/04 IDP01			12/07/04 IDP01			12/07/04 IDP01		
Date Analyzed	12/15/04			12/15/04			12/15/04		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com
1,1,1,2-TETRACHLOROETHANE	1	U		0.5	U		0.5	U	
1,1,1-TRICHLOROETHANE	1.6	U		0.8	U		0.8	U	
1,1,2,2-TETRACHLOROETHANE	0.8	U		0.4	U		0.4	U	
1,1,2-TRICHLOROETHANE	2	U		1	U		1	U	
1,1-DICHLOROETHANE	0.8	U		0.4	U		0.4	U	
1,1-DICHLOROETHENE	1	U		0.5	U		0.5	U	
1,2,3-TRICHLOROPROPANE	6.4	U		3.2	U		3.2	U	
1,2-DICHLOROBENZENE	0.6	U		0.3	U		0.3	U	
1,2-DICHLOROETHANE	1	U		0.5	U		0.5	U	
1,2-DICHLOROPROPANE	0.8	U		0.4	U		0.4	U	
1,3-DICHLOROBENZENE	0.6	U		0.3	U		0.3	U	
1,4-DICHLOROBENZENE	0.6	U		0.3	U		0.3	U	
2-BUTANONE (MEK)	200	U		100	U		100	U	b
2-HEXANONE	100	U		50	U		50	U	
4-METHYL-2-PENTANONE (MIBK)	200	U		100	U		0.46	J	g
ACETONE	200	U	b	100	U		110	U	b
ACRYLONITRILE	400	U		200	U		200	U	
BENZENE	0.8	U		0.4	U		0.4	U	
BROMOCHLOROMETHANE	0.8	U		0.4	U		0.4	U	
BROMODICHLOROMETHANE	1.6	U		0.8	U		0.8	U	
BROMOFORM	2.4	U		1.2	U		1.2	U	
BROMOMETHANE	2	U		1	U		1	U	
CARBON DISULFIDE	20	U		10	U		10	U	
CARBON TETRACHLORIDE	1	U		0.5	U		0.5	U	
CHLOROBENZENE	0.8	U		0.4	U		0.4	U	
CHLORODIBROMOMETHANE	1	U		0.5	U		0.5	U	
CHLOROETHANE	2	U		1	U		1	U	
CHLOROFORM	0.6	U		0.3	U		0.3	U	
CHLOROMETHANE	2.6	U		1.3	U		1.3	U	
CIS-1,2-DICHLOROETHENE	2.4	U		1.2	U		1.2	U	
CIS-1,3-DICHLOROPROPENE	1	U		0.5	U		0.5	U	
DIBROMOMETHANE	4.8	U		2.4	U		2.4	U	
DICHLORODIFLUOROMETHANE	2	U		1	U		1	U	

Validity (Val):
U - Non-detected
UJ - Non-detected estimated
R - Rejected
J - Estimated concentration

NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery exceeded
b - Lab method blank contamination
c - Calibration exceeded
d - Duplicate precision exceeded
e - MS/LCS recovery exceeded
f - Field blank contamination
g - Quantification below reporting limit
h - Holding time exceeded
i - Internal standard exceeded
j - Other qualifications
y - Resembles a fuel pattern but does not match the standards
z - Does not resemble a fuel pattern (single peaks)

Project : FORT IRWIN
Laboratory : Applied Physics & Chemistry Laboratory

VOA 8260 ANALYSIS

Matrix : WATER

TtEMI Sample ID / Units	100-VLT630-017 (UG/L)			100-VLT630-020 (UG/L)			100-VLT630-022 (UG/L)		
Sample Location	WASH WATER VAULT			TRIB BLANK 1			EQUIPMENT RINSATE 1		
Sample Depth (ft)	0.00 - 0.00			0.00 - 0.00			0.00 - 0.00		
Date Sampled / SDG Number	12/06/04 IDP01			12/07/04 IDP01			12/07/04 IDP01		
Date Analyzed	12/15/04			12/15/04			12/15/04		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com
ETHYLBENZENE	1.2	U		0.6	U		0.6	U	
F113	2	U		1	U		1	U	
IODOMETHANE	20	U		10	U		10	U	
METHYLENE CHLORIDE	2	U	b	1	U	b	1	U	b
STYRENE	0.8	U		0.4	U		0.4	U	
TETRACHLOROETHENE	2.8	U		1.4	U		1.4	U	
TOLUENE	2.2	U		1.1	U		1.1	U	
TRANS-1,2-DICHLOROETHENE	1.2	U		0.6	U		0.6	U	
TRANS-1,3-DICHLOROPROPENE	1	U		0.5	U		0.5	U	
TRANS-1,4-DICHLORO-2BUTENE	20	U		10	U		10	U	
TRICHLOROETHENE	2	U		1	U		1	U	
TRICHLOROFLUOROMETHANE	1.6	U		0.8	U		0.8	U	
VINYL ACETATE	100	R	c	50	R	c	50	R	c
VINYL CHLORIDE	2.2	U		1.1	U		1.1	U	
XYLENES (TOTAL)	5.8	U		2.9	U		2.9	U	

Validity (Val):
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J - Estimated concentration

NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery exceeded
b - Lab method blank contamination
c - Calibration exceeded
d - Duplicate precision exceeded
e - MS/LCS recovery exceeded
f - Field blank contamination
g - Quantification below reporting limit
h - Holding time exceeded
i - Internal standard exceeded
j - Other qualifications
y - Resembles a fuel pattern but does not match the standards
z - Does not resemble a fuel pattern (single peaks)

FLASH POINT ANALYSIS

Project : FORT IRWIN
Laboratory : Applied Physics & Chemistry Laboratory

Matrix : SOIL

Date: 04/08/05

TtEMI Sample ID / Units	100-VLT630-018 (C)			100-VLT630-018A (C)		
Sample Location	SOIL CUTTINGS COMPOSITE			SOIL CUTTINGS COMPOSITE		
Sample Depth (ft)	0.00 - 0.00			0.00 - 0.00		
Date Sampled / SDG Number	12/09/04 IDP02			12/09/04 IDP02		
Date Extracted / Analyzed	12/17/04 12/17/04			12/17/04 12/17/04		
Analyte	Result	Val	Com	Result	Val	Com
IGNITABILITY (FLASHPOINT)	100			100		

Validity (Val):
U - Non-detected
UJ - Non-detected estimated
R - Rejected
J - Estimated concentration

NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery exceeded
b - Lab method blank contamination
c - Calibration exceeded
d - Duplicate precision exceeded
e - MS/LCS recovery exceeded
f - Field blank contamination
g - Quantification below reporting limit
h - Holding time exceeded
i - Internal standard exceeded
j - Other qualifications
y - Resembles a fuel pattern but does not match the standards
z - Does not resemble a fuel pattern (single peaks)

Note

PCB ANALYSIS

Project : FORT IRWIN
Laboratory : Applied Physics & Chemistry Laboratory

Matrix : SOIL

Date: 04/08/05

TtEMI Sample ID / Units	100-VLT630-018 (UG/KG)			100-VLT630-018A (UG/KG)			100-VLT630-025 (UG/KG)			100-VLT630-026 (UG/KG)			100-VLT630-027 (UG/KG)		
Sample Location	SOIL CUTTINGS COMPOSITE			SOIL CUTTINGS COMPOSITE			VLT630-VE01-18			VLT630-VE02-18			VLT630-VE03-18		
Sample Depth (ft)	0.00 - 0.00			0.00 - 0.00			18.00 - 18.00			18.00 - 18.00			18.00 - 18.00		
Date Sampled / SDG Number	12/09/04 IDP02			12/09/04 IDP02			12/09/04 IDP02			12/09/04 IDP02			12/09/04 IDP02		
Date Extracted / Analyzed	12/10/04 12/17/04			12/10/04 12/17/04			12/10/04 12/15/04			12/10/04 12/15/04			12/10/04 12/15/04		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
PCB-1016 (AROCLOR 1016)	35	U	b	39	U	b	39	U	b	38	U		35	U	b
PCB-1221 (AROCLOR 1221)	70	U		78	U		78	U		75	U		71	U	
PCB-1232 (AROCLOR 1232)	35	U		39	U		39	U		38	U		35	U	
PCB-1242 (AROCLOR 1242)	35	U		39	U		39	U		38	U		35	U	
PCB-1248 (AROCLOR 1248)	35	U		39	U		39	U		38	U		35	U	
PCB-1254 (AROCLOR 1254)	35	U		39	U		39	U		38	U		35	U	
PCB-1260 (AROCLOR 1260)	35	U		39	U		39	U		38	U		35	U	

Validity (Val):
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UJ - Non-detected estimated
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J - Estimated concentration

NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery exceeded
b - Lab method blank contamination
c - Calibration exceeded
d - Duplicate precision exceeded
e - MS/LCS recovery exceeded
f - Field blank contamination
g - Quantification below reporting limit
h - Holding time exceeded
i - Internal standard exceeded
j - Other qualifications
y - Resembles a fuel pattern but does not match the standards
z - Does not resemble a fuel pattern (single peaks)

PERCENT MOISTURE ANALYSIS

Project : FORT IRWIN
Laboratory : Applied Physics & Chemistry Laboratory

Matrix : SOIL

Date: 04/08/05

TtEMI Sample ID / Units	100-VLT630-018 (%MST)			100-VLT630-018A (%MST)			100-VLT630-025 (%MST)			100-VLT630-026 (%MST)			100-VLT630-027 (%MST)		
Sample Location	SOIL CUTTINGS COMPOSITE			SOIL CUTTINGS COMPOSITE			VLT630-VE01-18			VLT630-VE02-18			VLT630-VE03-18		
Sample Depth (ft)	0.00 - 0.00			0.00 - 0.00			18.00 - 18.00			18.00 - 18.00			18.00 - 18.00		
Date Sampled / SDG Number	12/09/04 IDP02			12/09/04 IDP02			12/09/04 IDP02			12/09/04 IDP02			12/09/04 IDP02		
Date Extracted / Analyzed	12/10/04 12/10/04			12/10/04 12/10/04			12/10/04 12/10/04			12/10/04 12/10/04			12/10/04 12/10/04		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
MOISTURE	5.1			15.9			15.7			12.1			6.5		

Validity (Val):
U - Non-detected
UJ - Non-detected estimated
R - Rejected
J - Estimated concentration

NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery exceeded
b - Lab method blank contamination
c - Calibration exceeded
d - Duplicate precision exceeded
e - MS/LCS recovery exceeded
f - Field blank contamination
g - Quantification below reporting limit
h - Holding time exceeded
i - Internal standard exceeded
j - Other qualifications
v - Resembles a fuel pattern but does not match the standards
z - Does not resemble a fuel pattern (single peaks)

Note :

PH ANALYSIS

Project : FORT IRWIN
Laboratory : Applied Physics & Chemistry Laboratory

Matrix : SOIL

Date: 04/08/05

TtEMI Sample ID / Units	100-VLT630-018 ()			100-VLT630-018A ()			100-VLT630-025 ()			100-VLT630-026 ()			100-VLT630-027 ()		
Sample Location	SOIL CUTTINGS COMPOSITE			SOIL CUTTINGS COMPOSITE			VLT630-VE01-18			VLT630-VE02-18			VLT630-VE03-18		
Sample Depth (ft)	0.00 - 0.00			0.00 - 0.00			18.00 - 18.00			18.00 - 18.00			18.00 - 18.00		
Date Sampled / SDG Number	12/09/04 IDP02			12/09/04 IDP02			12/09/04 IDP02			12/09/04 IDP02			12/09/04 IDP02		
Date Extracted / Analyzed	12/20/04 12/20/04			12/20/04 12/20/04			12/20/04 12/20/04			12/20/04 12/20/04			12/20/04 12/20/04		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
PH	8.82			10.21			9.21			9.33			9.22		

Validity (Val):
U - Non-detected
UJ - Non-detected estimated
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J - Estimated concentration

NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery exceeded
b - Lab method blank contamination
c - Calibration exceeded
d - Duplicate precision exceeded
e - MS/LCS recovery exceeded
f - Field blank contamination
g - Quantification below reporting limit
h - Holding time exceeded
i - Internal standard exceeded
j - Other qualifications
y - Resembles a fuel pattern but does not match the standards
z - Does not resemble a fuel pattern (single peaks)

Note :

REACTIVITY ANALYSIS

Project : FORT IRWIN
Laboratory : Applied Physics & Chemistry Laboratory

Matrix : SOIL

TtEMI Sample ID / Units	100-VLT630-018 (MG/KG)			100-VLT630-018A (MG/KG)		
Sample Location	SOIL CUTTINGS COMPOSITE			SOIL CUTTINGS COMPOSITE		
Sample Depth (ft)	0.00 - 0.00			0.00 - 0.00		
Date Sampled / SDG Number	12/09/04 IDP02			12/09/04 IDP02		
Date Extracted / Analyzed	12/15/04 12/15/04			12/15/04 12/15/04		
Analyte	Result	Val	Com	Result	Val	Com
REACTIVITY: CYANIDE	260	R	e	300	R	e
REACTIVITY: SULFIDE	530	UJ	e	590	UJ	e

Validity (Val):
U - Non-detected
UJ - Non-detected estimated
R - Rejected
J - Estimated concentration

NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery exceeded
b - Lab method blank contamination
c - Calibration exceeded
d - Duplicate precision exceeded
e - MS/LCS recovery exceeded
f - Field blank contamination
g - Quantification below reporting limit
h - Holding time exceeded
i - Internal standard exceeded
j - Other qualifications
y - Resembles a fuel pattern but does not match the standards
z - Does not resemble a fuel pattern (single peaks)

Note :

TtEMI Sample ID / Units	100-VLT630-018 (UG/KG)			100-VLT630-018A (UG/KG)			100-VLT630-025 (UG/KG)			100-VLT630-026 (UG/KG)			100-VLT630-027 (UG/KG)		
Sample Location	SOIL CUTTINGS COMPOSITE			SOIL CUTTINGS COMPOSITE			VLT630-VE01-18			VLT630-VE02-18			VLT630-VE03-18		
Sample Depth (ft)	0.00 - 0.00			0.00 - 0.00			18.00 - 18.00			18.00 - 18.00			18.00 - 18.00		
Date Sampled / SDG Number	12/09/04 IDP02			12/09/04 IDP02			12/09/04 IDP02			12/09/04 IDP02			12/09/04 IDP02		
Date Extracted / Analyzed	12/14/04 12/15/04			12/14/04 12/16/04			12/14/04 12/15/04			12/14/04 12/15/04			12/14/04 12/16/04		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
1,1'-BIPHENYL	350	U		390	U		390	U		380	U		350	U	
1,2,4-TRICHLOROBENZENE	350	U		390	U		390	U		380	U		350	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	350	U		390	U		390	U		380	U		350	U	
2,4,5-TRICHLOROPHENOL	1800	U		2000	U		2000	U		1900	U		1800	U	
2,4,6-TRICHLOROPHENOL	350	U		390	U		390	U		380	U		350	U	
2,4-DICHLOROPHENOL	350	U		390	U		390	U		380	U		350	U	
2,4-DIMETHYLPHENOL	350	U		390	U		390	U		380	U		350	U	
2,4-DINITROPHENOL	3500	U		3900	U		3900	U		3800	U		3500	U	
2,4-DINITROTOLUENE	350	U		390	U		390	U		380	U		350	U	
2,6-DINITROTOLUENE	350	U		390	U		390	U		380	U		350	U	
2-CHLORONAPHTHALENE	350	U		390	U		390	U		380	U		350	U	
2-CHLOROPHENOL	350	U		390	U		390	U		380	U		350	U	
2-METHYLNAPHTHALENE	350	U		390	U		390	U		380	U		350	U	
2-METHYLPHENOL	350	U		390	U		390	U		380	U		350	U	
2-NITROANILINE	3500	U		3900	U		3900	U		3800	U		3500	U	
2-NITROPHENOL	350	U		390	U		390	U		380	U		350	U	
3,3'-DICHLOROBENZIDINE	1400	U		1500	U		1500	U		1500	U		1400	U	
3-NITROANILINE	3500	U		3900	U		3900	U		3800	U		3500	U	
4,6-DINITRO-2-METHYLPHENOL	3500	U		3900	U		3900	U		3800	U		3500	U	
4-BROMOPHENYL-PHENYLETHER	350	U		390	U		390	U		380	U		350	U	
4-CHLORO-3-METHYLPHENOL	350	U		390	U		390	U		380	U		350	U	
4-CHLOROANILINE	350	U		390	U		390	U		380	U		350	U	
4-CHLOROPHENYL-PHENYLETHER	350	U		390	U		390	U		380	U		350	U	
4-METHYLPHENOL	350	U		390	U		390	U		380	U		350	U	
4-NITROANILINE	1800	U		2000	U		2000	U		1900	U		1800	U	
4-NITROPHENOL	350	U		390	U		390	U		380	U		350	U	
ACENAPHTHENE	350	U		390	U		390	U		380	U		350	U	
ACENAPHTHYLENE	350	U		390	U		390	U		380	U		350	U	
ACETOPHENONE	350	U		390	U		390	U		380	U		350	U	
ANTHRACENE	350	U		390	U		390	U		380	U		350	U	
BENZO(A)ANTHRACENE	350	U		390	U		390	U		380	U		350	U	
BENZO(A)PYRENE	350	U		390	U		390	U		380	U		350	U	
BENZO(B)FLUORANTHENE	350	U		390	U		390	U		380	U		350	U	

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c - Calibration exceeded
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e - MS/LCS recovery exceeded
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g - Quantification below reporting limit
h - Holding time exceeded
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j - Other qualifications
y - Resembles a fuel pattern but does not match the standards
z - Does not resemble a fuel pattern (single peaks)

TtEMI Sample ID / Units	100-VLT630-018 (UG/KG)			100-VLT630-018A (UG/KG)			100-VLT630-025 (UG/KG)			100-VLT630-026 (UG/KG)			100-VLT630-027 (UG/KG)		
Sample Location	SOIL CUTTINGS COMPOSITE			SOIL CUTTINGS COMPOSITE			VLT630-VE01-18			VLT630-VE02-18			VLT630-VE03-18		
Sample Depth (ft)	0.00 - 0.00			0.00 - 0.00			18.00 - 18.00			18.00 - 18.00			18.00 - 18.00		
Date Sampled / SDG Number	12/09/04 IDP02			12/09/04 IDP02			12/09/04 IDP02			12/09/04 IDP02			12/09/04 IDP02		
Date Extracted / Analyzed	12/14/04 12/15/04			12/14/04 12/16/04			12/14/04 12/15/04			12/14/04 12/15/04			12/14/04 12/16/04		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
BENZO(G,H,I)PERYLENE	350	U		390	U		390	U		380	U		350	U	
BENZO(K)FLUORANTHENE	350	U		390	U		390	U		380	U		350	U	
BENZOIC ACID	2600	U		3000	U		3000	U		2800	U		2700	U	
BIS(2-CHLOROETHOXY)METHANE	350	U		390	U		390	U		380	U		350	U	
BIS(2-CHLOROETHYL)ETHER	350	U		390	U		390	U		380	U		350	U	
BIS(2-ETHYLHEXYL)PHTHALATE	350	U	b	390	U		390	U		380	U		350	U	
BUTYLBENZYLPHTHALATE	350	U		390	U		390	U		380	U		350	U	
CARBAZOLE	350	U		390	U		390	U		380	U		350	U	
CHRYSENE	350	U		390	U		390	U		380	U		350	U	
DI-N-BUTYLPHTHALATE	350	U		390	U		390	U		380	U		350	U	
DI-N-OCTYLPHTHALATE	350	U		390	U		390	U		380	U		350	U	
DIBENZ(A,H)ANTHRACENE	350	U		390	U		390	U		380	U		350	U	
DIBENZOFURAN	350	U		390	U		390	U		380	U		350	U	
DIETHYLPHTHALATE	350	U		390	U		390	U		380	U		350	U	
DIMETHYLPHTHALATE	350	U		390	U		390	U		380	U		350	U	
FLUORANTHENE	350	U		390	U		390	U		380	U		350	U	
FLUORENE	350	U		390	U		390	U		380	U		350	U	
HEXACHLOROBENZENE	350	U		390	U		390	U		380	U		350	U	
HEXACHLOROBUTADIENE	350	U		390	U		390	U		380	U		350	U	
HEXACHLOROCYCLOPENTADIENE	350	U		390	U		390	U		380	U		350	U	
HEXACHLOROETHANE	350	U		390	U		390	U		380	U		350	U	
INDENO(1,2,3-CD)PYRENE	350	U		390	U		390	U		380	U		350	U	
ISOPHORONE	350	U		390	U		390	U		380	U		350	U	
N-NITROSO-DI-N-PROPYLAMINE	350	U		390	U		390	U		380	U		350	U	
N-NITROSODIPHENYLAMINE (1)	350	U		390	U		390	U		380	U		350	U	
NAPHTHALENE	350	U		390	U		390	U		380	U		350	U	
NITROBENZENE	350	U		390	U		390	U		380	U		350	U	
PENTACHLOROPHENOL	1800	U		2000	U		2000	U		1900	U		1800	U	
PHENANTHRENE	350	U		390	U		390	U		380	U		350	U	
PHENOL	350	U		390	U		390	U		380	U		350	U	
PYRENE	350	U		390	U		390	U		380	U		350	U	

Validity (Val):
U - Non-detected
UJ - Non-detected estimated
R - Rejected
J - Estimated concentration

NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery exceeded
b - Lab method blank contamination
c - Calibration exceeded
d - Duplicate precision exceeded
e - MS/LCS recovery exceeded
f - Field blank contamination
g - Quantification below reporting limit
h - Holding time exceeded
i - Internal standard exceeded
j - Other qualifications
y - Resembles a fuel pattern but does not match the standards
z - Does not resemble a fuel pattern (single peaks)

METALS (TOTAL) ANALYSIS

Project : FORT IRWIN
Laboratory : Applied Physics & Chemistry Laboratory

Matrix : SOIL

TtEMI Sample ID / Units	100-VLT630-018 (MG/KG)			100-VLT630-018A (MG/KG)			100-VLT630-025 (MG/KG)			100-VLT630-026 (MG/KG)			100-VLT630-027 (MG/KG)		
Sample Location	SOIL CUTTINGS COMPOSITE			SOIL CUTTINGS COMPOSITE			VLT630-VE01-18			VLT630-VE02-18			VLT630-VE03-18		
Sample Depth (ft)	0.00 - 0.00			0.00 - 0.00			18.00 - 18.00			18.00 - 18.00			18.00 - 18.00		
Date Sampled / SDG Number	12/09/04 IDP02			12/09/04 IDP02			12/09/04 IDP02			12/09/04 IDP02			12/09/04 IDP02		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
ANTIMONY	0.58	J	g	0.30	J	g	0.77	J	g	0.59	J	g	0.70	J	g
ARSENIC	5.0			3.0			3.0			3.2			4.9		
BARIUM	60.5			70.8			67.7			47.1			156		
BERYLLIUM	0.003	U		0.027	J	g	0.004	U		0.18	J	g	0.075	J	g
CADMIUM	0.21	J	g	0.027	U	b	0.013	U		0.013	U		0.012	U	
CHROMIUM	17.6			26.3			10.4			8.6			7.5		
COBALT	4.7			4.2			4.5			5.1			4.3		
COPPER	15.9			8.7			9.9			13.4			9.8		
LEAD	5.8			6.0			4.5			5.2			4.1		
MERCURY	0.16	J	g	0.35			0.37			0.23	J	g	0.24		
MOLYBDENUM	1.4			0.58			0.72			0.073	U		0.23		
NICKEL	8.4			6.9			7.2			7.8			6.6		
SELENIUM	0.071	U		0.080	U		0.079	U		0.075	U		0.28	U	b
SILVER	0.047	U		0.053	U		0.053	U		0.051	U		0.048	U	
THALLIUM	0.082	U		0.093	U		0.092	U		0.089	U		0.083	U	
VANADIUM	18.4			17.5			20.0			22.1			20.3		
ZINC	35.6			25.7			32.5			31.8			26.3		

Validity (Val):
U - Non-detected
UJ - Non-detected estimated
R - Rejected
J - Estimated concentration

NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery exceeded
b - Lab method blank contamination
c - Calibration exceeded
d - Duplicate precision exceeded
e - MS/LCS recovery exceeded
f - Field blank contamination
g - Quantification below reporting limit
h - Holding time exceeded
i - Internal standard exceeded
j - Other qualifications
y - Resembles a fuel pattern but does not match the standards
z - Does not resemble a fuel pattern (single peaks)

TPH EXTRACTABLES (DIESEL) ANALYSIS

Project : FORT IRWIN
Laboratory : Applied Physics & Chemistry Laboratory

Matrix : SOIL

Date: 04/08/05

TtEMI Sample ID / Units	100-VLT630-018 (MG/KG)			100-VLT630-018A (MG/KG)			100-VLT630-025 (MG/KG)			100-VLT630-026 (MG/KG)			100-VLT630-027 (MG/KG)		
Sample Location	SOIL CUTTINGS COMPOSITE			SOIL CUTTINGS COMPOSITE			VLT630-VE01-18			VLT630-VE02-18			VLT630-VE03-18		
Sample Depth (ft)	0.00 - 0.00			0.00 - 0.00			18.00 - 18.00			18.00 - 18.00			18.00 - 18.00		
Date Sampled / SDG Number	12/09/04 IDP02			12/09/04 IDP02			12/09/04 IDP02			12/09/04 IDP02			12/09/04 IDP02		
Date Extracted / Analyzed	12/16/04 12/17/04			12/16/04 12/17/04			12/16/04 12/17/04			12/16/04 12/17/04			12/16/04 12/17/04		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
MOTOR OILS	335			68.0			26.9			11	U		7.7	J	g
PHC AS DIESEL FUEL	53	U		15.1			12	U		11	U		11	U	

Validity (Val):
U - Non-detected
UJ - Non-detected estimated
R - Rejected
J - Estimated concentration

NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery exceeded
b - Lab method blank contamination
c - Calibration exceeded
d - Duplicate precision exceeded
e - MS/LCS recovery exceeded
f - Field blank contamination
g - Quantification below reporting limit
h - Holding time exceeded
i - Internal standard exceeded
j - Other qualifications
y - Resembles a fuel pattern but does not match the standards
z - Does not resemble a fuel pattern (single peaks)

Note :

TPH PURGEABLES (GASOLINE) ANALYSIS

Project : FORT IRWIN
Laboratory : Applied Physics & Chemistry Laboratory

Matrix : SOIL

Date: 04/08/05

TtEMI Sample ID / Units	100-VLT630-018 (MG/KG)			100-VLT630-018A (MG/KG)			100-VLT630-025 (MG/KG)			100-VLT630-026 (MG/KG)			100-VLT630-027 (MG/KG)		
Sample Location	SOIL CUTTINGS COMPOSITE			SOIL CUTTINGS COMPOSITE			VLT630-VE01-18			VLT630-VE02-18			VLT630-VE03-18		
Sample Depth (ft)	0.00 - 0.00			0.00 - 0.00			18.00 - 18.00			18.00 - 18.00			18.00 - 18.00		
Date Sampled / SDG Number	12/09/04 IDP02			12/09/04 IDP02			12/09/04 IDP02			12/09/04 IDP02			12/09/04 IDP02		
Date Extracted / Analyzed	12/10/04 12/10/04			12/10/04 12/10/04			12/10/04 12/10/04			12/10/04 12/10/04			12/10/04 12/10/04		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
PHC AS GASOLINE	2.5	U		1.6	U		2.1	U		1.9	U		1.7	U	

Validity (Val):
U - Non-detected
UJ - Non-detected estimated
R - Rejected
J - Estimated concentration

NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery exceeded
b - Lab method blank contamination
c - Calibration exceeded
d - Duplicate precision exceeded
e - MS/LCS recovery exceeded
f - Field blank contamination
g - Quantification below reporting limit
h - Holding time exceeded
i - Internal standard exceeded
j - Other qualifications
y - Resembles a fuel pattern but does not match the standards
z - Does not resemble a fuel pattern (single peaks)

Note :

TtEMI Sample ID / Units	100-VLT630-018 (UG/KG)			100-VLT630-018A (UG/KG)			100-VLT630-025 (UG/KG)			100-VLT630-026 (UG/KG)			100-VLT630-027 (UG/KG)		
Sample Location	SOIL CUTTINGS COMPOSITE			SOIL CUTTINGS COMPOSITE			VLT630-VE01-18			VLT630-VE02-18			VLT630-VE03-18		
Sample Depth (ft)	0.00 - 0.00			0.00 - 0.00			18.00 - 18.00			18.00 - 18.00			18.00 - 18.00		
Date Sampled / SDG Number	12/09/04 IDP02			12/09/04 IDP02			12/09/04 IDP02			12/09/04 IDP02			12/09/04 IDP02		
Date Analyzed	12/10/04			12/10/04			12/10/04			12/10/04			12/10/04		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
1,1,1,2-TETRACHLOROETHANE	10	U		7.7	U		6.6	U		8.8	U		7.9	U	
1,1,1-TRICHLOROETHANE	10	U		7.7	U		6.6	U		8.8	U		7.9	U	
1,1,2,2-TETRACHLOROETHANE	10	U		7.7	U		6.6	U		8.8	U		7.9	U	
1,1,2-TRICHLOROETHANE	10	U		7.7	U		6.6	U		8.8	U		7.9	U	
1,1-DICHLOROETHANE	10	U		7.7	U		6.6	U		8.8	U		7.9	U	
1,1-DICHLOROETHENE	10	U		7.7	U		6.6	U		8.8	U		7.9	U	
1,2,3-TRICHLOROPROPANE	10	U		7.7	U		6.6	U		8.8	U		7.9	U	
1,2-DICHLOROBENZENE	10	U		7.7	U		6.6	U		8.8	U		7.9	U	
1,2-DICHLOROETHANE	10	U		7.7	U		6.6	U		8.8	U		7.9	U	
1,2-DICHLOROPROPANE	10	U		7.7	U		6.6	U		8.8	U		7.9	U	
1,3-DICHLOROBENZENE	10	U		7.7	U		6.6	U		8.8	U		7.9	U	
1,4-DICHLOROBENZENE	10	U		7.7	U		6.6	U		8.8	U		7.9	U	
2-BUTANONE (MEK)	200	U		150	U		130	U		180	U		160	U	
2-HEXANONE	30	U		23	U		20	U		26	U		24	U	
4-METHYL-2-PENTANONE (MIBK)	100	U		77	U		66	U		88	U		79	U	
ACETONE	100	UJ	c	77	UJ	c	66	UJ	c	88	UJ	c	79	UJ	c
ACRYLONITRILE	30	U		23	U		20	U		26	U		24	U	
BENZENE	10	U		7.7	U		6.6	U		8.8	U		7.9	U	
BROMOCHLOROMETHANE	10	U		7.7	U		6.6	U		8.8	U		7.9	U	
BROMODICHLOROMETHANE	10	U		7.7	U		6.6	U		8.8	U		7.9	U	
BROMOFORM	10	U		7.7	U		6.6	U		8.8	U		7.9	U	
BROMOMETHANE	10	U		7.7	U		6.6	U		8.8	U		7.9	U	
CARBON DISULFIDE	10	U		7.7	U		6.6	U		8.8	U		7.9	U	
CARBON TETRACHLORIDE	10	U		7.7	U		6.6	U		8.8	U		7.9	U	
CHLOROBENZENE	10	U		7.7	U		6.6	U		8.8	U		7.9	U	
CHLORODIBROMOMETHANE	10	U		7.7	U		6.6	U		8.8	U		7.9	U	
CHLOROETHANE	10	U		7.7	U		6.6	U		8.8	U		7.9	U	
CHLOROFORM	10	U	f	7.7	U	f	6.6	U	f	8.8	U	f	7.9	U	f
CHLOROMETHANE	10	U		7.7	U		6.6	U		8.8	U		7.9	U	
CIS-1,2-DICHLOROETHENE	10	U		7.7	U		6.6	U		8.8	U		7.9	U	
CIS-1,3-DICHLOROPROPENE	10	U		7.7	U		6.6	U		8.8	U		7.9	U	
DIBROMOMETHANE	10	U		7.7	U		6.6	U		8.8	U		7.9	U	
DICHLORODIFLUOROMETHANE	10	U		7.7	U		6.6	U		8.8	U		7.9	U	

Validity (Val):
U - Non-detected
UJ - Non-detected estimated
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J - Estimated concentration

NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery exceeded
b - Lab method blank contamination
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e - MS/LCS recovery exceeded
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g - Quantification below reporting limit
h - Holding time exceeded
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j - Other qualifications
y - Resembles a fuel pattern but does not match the standards
z - Does not resemble a fuel pattern (single peaks)

TtEMI Sample ID / Units	100-VLT630-018 (UG/KG)			100-VLT630-018A (UG/KG)			100-VLT630-025 (UG/KG)			100-VLT630-026 (UG/KG)			100-VLT630-027 (UG/KG)		
Sample Location	SOIL CUTTINGS COMPOSITE			SOIL CUTTINGS COMPOSITE			VLT630-VE01-18			VLT630-VE02-18			VLT630-VE03-18		
Sample Depth (ft)	0.00 - 0.00			0.00 - 0.00			18.00 - 18.00			18.00 - 18.00			18.00 - 18.00		
Date Sampled / SDG Number	12/09/04 IDP02			12/09/04 IDP02			12/09/04 IDP02			12/09/04 IDP02			12/09/04 IDP02		
Date Analyzed	12/10/04			12/10/04			12/10/04			12/10/04			12/10/04		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
ETHYLBENZENE	10	U		7.7	U		6.6	U		8.8	U		7.9	U	
F113	10	U		7.7	U		6.6	U		8.8	U		7.9	U	
IODOMETHANE	30	U		23	U		20	U		26	U		24	U	
METHYLENE CHLORIDE	10	U	b	7.7	U	b	6.6	U	b	8.8	U	b	7.9	U	b
STYRENE	10	U		7.7	U		6.6	U		8.8	U		7.9	U	
TETRACHLOROETHENE	10	U		7.7	U		6.6	U		8.8	U		7.9	U	
TOLUENE	1.4	J	g	7.7	U		0.91	J	g	1.4	J	g	7.9	U	
TRANS-1,2-DICHLOROETHENE	10	U		7.7	U		6.6	U		8.8	U		7.9	U	
TRANS-1,3-DICHLOROPROPENE	10	U		7.7	U		6.6	U		8.8	U		7.9	U	
TRANS-1,4-DICHLORO-2BUTENE	30	U		23	U		20	U		26	U		24	U	
TRICHLOROETHENE	10	U		7.7	U		6.6	U		8.8	U		7.9	U	
TRICHLOROFLUOROMETHANE	10	U		7.7	U		6.6	U		8.8	U		7.9	U	
VINYL ACETATE	30	U		23	U		20	U		26	U		24	U	
VINYL CHLORIDE	10	U		7.7	U		6.6	U		8.8	U		7.9	U	
XYLENES (TOTAL)	30	U		2.8	J	g	20	U		26	U		24	U	

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e - MS/LCS recovery exceeded
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g - Quantification below reporting limit
h - Holding time exceeded
i - Internal standard exceeded
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y - Resembles a fuel pattern but does not match the standards
z - Does not resemble a fuel pattern (single peaks)

TtEMI Sample ID / Units	100-VLT630-019 (UG/L)			100-VLT630-024 (UG/L)			100-VLT630-028 (UG/L)		
Sample Location	DECON WATER IDW			FIELD BLANK			EQUIPMENT RINSATE 2		
Sample Depth (ft)	0.00 - 0.00			0.00 - 0.00			0.00 - 0.00		
Date Sampled / SDG Number	12/09/04 IDP02			12/09/04 IDP02			12/09/04 IDP02		
Date Extracted / Analyzed	12/14/04 12/16/04			12/14/04 12/16/04			12/14/04 12/16/04		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com
PCB-1016 (AROCLOR 1016)	0.96	U	f	0.96	UJ	j	0.12	J	g
PCB-1221 (AROCLOR 1221)	1.9	U		1.9	U		1.9	U	
PCB-1232 (AROCLOR 1232)	0.96	U		0.96	U		0.96	U	
PCB-1242 (AROCLOR 1242)	0.96	U		0.96	U		0.96	U	
PCB-1248 (AROCLOR 1248)	0.96	U		0.96	U		0.96	U	
PCB-1254 (AROCLOR 1254)	0.96	U		0.96	U		0.96	U	
PCB-1260 (AROCLOR 1260)	0.96	U		0.96	U		0.96	U	

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Applicable Comments (Com):
a - Surrogate recovery exceeded
b - Lab method blank contamination
c - Calibration exceeded
d - Duplicate precision exceeded
e - MS/LCS recovery exceeded
f - Field blank contamination
g - Quantification below reporting limit
h - Holding time exceeded
i - Internal standard exceeded
j - Other qualifications
y - Resembles a fuel pattern but does not match the standards
z - Does not resemble a fuel pattern (single peaks)

Project : FORT IRWIN
Laboratory : Applied Physics & Chemistry Laboratory

SVOA ANALYSIS

Matrix : WATER

TtEMI Sample ID / Units	100-VLT630-019 (UG/L)			100-VLT630-024 (UG/L)			100-VLT630-028 (UG/L)		
Sample Location	DECON WATER IDW			FIELD BLANK			EQUIPMENT RINSATE 2		
Sample Depth (ft)	0.00 - 0.00			0.00 - 0.00			0.00 - 0.00		
Date Sampled / SDG Number	12/09/04 IDP02			12/09/04 IDP02			12/09/04 IDP02		
Date Extracted / Analyzed	12/13/04 12/17/04			12/13/04 12/17/04			12/13/04 12/17/04		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com
1,1'-BIPHENYL	9.6	U		9.6	U		9.6	U	
1,2,4-TRICHLOROBENZENE	9.6	U		9.6	U		9.6	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	9.6	U		9.6	U		9.6	U	
2,4,5-TRICHLOROPHENOL	48	U		48	U		48	U	
2,4,6-TRICHLOROPHENOL	48	U		48	U		48	U	
2,4-DICHLOROPHENOL	9.6	U		9.6	U		9.6	U	
2,4-DIMETHYLPHENOL	9.6	U		9.6	U		9.6	U	
2,4-DINITROPHENOL	48	U		48	U		48	U	
2,4-DINITROTOLUENE	9.6	U		9.6	U		9.6	U	
2,6-DINITROTOLUENE	9.6	U		9.6	U		9.6	U	
2-CHLORONAPHTHALENE	9.6	U		9.6	U		9.6	U	
2-CHLOROPHENOL	9.6	U		9.6	U		9.6	U	
2-METHYLNAPHTHALENE	9.6	U		9.6	U		9.6	U	
2-METHYLPHENOL	9.6	U		9.6	U		9.6	U	
2-NITROANILINE	48	U		48	U		48	U	
2-NITROPHENOL	9.6	U		9.6	U		9.6	U	
3,3'-DICHLOROBENZIDINE	19	U		19	U		19	U	
3-NITROANILINE	48	U		48	U		48	U	
4,6-DINITRO-2-METHYLPHENOL	48	U		48	U		48	U	
4-BROMOPHENYL-PHENYLETHER	9.6	U		9.6	U		9.6	U	
4-CHLORO-3-METHYLPHENOL	9.6	U		9.6	U		9.6	U	
4-CHLOROANILINE	9.6	U		9.6	U		9.6	U	
4-CHLOROPHENYL-PHENYLETHER	9.6	U		9.6	U		9.6	U	
4-METHYLPHENOL	9.6	U		9.6	U		9.6	U	
4-NITROANILINE	48	U		48	U		48	U	
4-NITROPHENOL	48	U		48	U		48	U	
ACENAPHTHENE	9.6	U		9.6	U		9.6	U	
ACENAPHTHYLENE	9.6	U		9.6	U		9.6	U	
ACETOPHENONE	9.6	U		9.6	U		9.6	U	
ANTHRACENE	9.6	U		9.6	U		9.6	U	
BENZO(A)ANTHRACENE	9.6	U		9.6	U		9.6	U	
BENZO(A)PYRENE	9.6	U		9.6	U		9.6	U	
BENZO(B)FLUORANTHENE	9.6	U		9.6	U		9.6	U	

Validity (Val):
U - Non-detected
UJ - Non-detected estimated
R - Rejected
J - Estimated concentration
NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery exceeded
b - Lab method blank contamination
c - Calibration exceeded
d - Duplicate precision exceeded
e - MS/LCS recovery exceeded
f - Field blank contamination
g - Quantification below reporting limit
h - Holding time exceeded
i - Internal standard exceeded
j - Other qualifications
y - Resembles a fuel pattern but does not match the standards
z - Does not resemble a fuel pattern (single peaks)

TtEMI Sample ID / Units	100-VLT630-019 (UG/L)			100-VLT630-024 (UG/L)			100-VLT630-028 (UG/L)		
Sample Location	DECON WATER IDW			FIELD BLANK			EQUIPMENT RINSATE 2		
Sample Depth (ft)	0.00 - 0.00			0.00 - 0.00			0.00 - 0.00		
Date Sampled / SDG Number	12/09/04 IDP02			12/09/04 IDP02			12/09/04 IDP02		
Date Extracted / Analyzed	12/13/04 12/17/04			12/13/04 12/17/04			12/13/04 12/17/04		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com
BENZO(G,H,I)PERYLENE	9.6	U		9.6	U		9.6	U	
BENZO(K)FLUORANTHENE	9.6	U		9.6	U		9.6	U	
BENZOIC ACID	48	U		48	U		48	U	
BIS(2-CHLOROETHOXY)METHANE	9.6	U		9.6	U		9.6	U	
BIS(2-CHLOROETHYL)ETHER	9.6	U		9.6	U		9.6	U	
BIS(2-ETHYLHEXYL)PHTHALATE	9.6	U		9.6	U		12.2	U	b
BUTYLBENZYLPHTHALATE	9.6	U		9.6	U		9.6	U	
CARBAZOLE	9.6	U		9.6	U		9.6	U	
CHRYSENE	9.6	U		9.6	U		9.6	U	
DI-N-BUTYLPHTHALATE	9.6	U		9.6	U		9.6	U	
DI-N-OCTYLPHTHALATE	9.6	U		9.6	U		9.6	U	
DIBENZ(A,H)ANTHRACENE	9.6	U		9.6	U		9.6	U	
DIBENZOFURAN	9.6	U		9.6	U		9.6	U	
DIETHYLPHTHALATE	9.6	U		9.6	U		9.6	U	
DIMETHYLPHTHALATE	9.6	U		9.6	U		9.6	U	
FLUORANTHENE	9.6	U		9.6	U		9.6	U	
FLUORENE	9.6	U		9.6	U		9.6	U	
HEXACHLOROBENZENE	9.6	U		9.6	U		9.6	U	
HEXACHLOROBUTADIENE	9.6	U		9.6	U		9.6	U	
HEXACHLOROCYCLOPENTADIENE	9.6	U		9.6	U		9.6	U	
HEXACHLOROETHANE	9.6	U		9.6	U		9.6	U	
INDENO(1,2,3-CD)PYRENE	9.6	U		9.6	U		9.6	U	
ISOPHORONE	9.6	U		9.6	U		9.6	U	
N-NITROSO-DI-N-PROPYLAMINE	9.6	U		9.6	U		9.6	U	
N-NITROSODIPHENYLAMINE (1)	9.6	U		9.6	U		9.6	U	
NAPHTHALENE	9.6	U		9.6	U		9.6	U	
NITROBENZENE	9.6	U		9.6	U		9.6	U	
PENTACHLOROPHENOL	29	U		29	U		29	U	
PHENANTHRENE	9.6	U		9.6	U		9.6	U	
PHENOL	9.6	U		9.6	U		9.6	U	
PYRENE	9.6	U		9.6	U		9.6	U	

Validity (Val):
U - Non-detected
UJ - Non-detected estimated
R - Rejected
J - Estimated concentration

NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery exceeded
b - Lab method blank contamination
c - Calibration exceeded
d - Duplicate precision exceeded
e - MS/LCS recovery exceeded
f - Field blank contamination
g - Quantification below reporting limit
h - Holding time exceeded
i - Internal standard exceeded
j - Other qualifications
y - Resembles a fuel pattern but does not match the standards
z - Does not resemble a fuel pattern (single peaks)

METALS (TOTAL) ANALYSIS

Project : FORT IRWIN
Laboratory : Applied Physics & Chemistry Laboratory

Matrix : WATER

TtEMI Sample ID / Units	100-VLT630-019 (UG/L)			100-VLT630-024 (UG/L)			100-VLT630-028 (UG/L)		
Sample Location	DECON WATER IDW			FIELD BLANK			EQUIPMENT RINSATE 2		
Sample Depth (ft)	0.00 - 0.00			0.00 - 0.00			0.00 - 0.00		
Date Sampled / SDG Number	12/09/04 IDP02			12/09/04 IDP02			12/09/04 IDP02		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com
ANTIMONY	3.4	U	b	3.4	U		3.4	U	
ARSENIC	4.1	U	b	1.2	U		1.2	U	
BARIUM	150			0.30	U	b	0.94	U	b
BERYLLIUM	0.083	J	g	0.050	U		0.050	U	
CADMIUM	0.24	U		0.24	U		0.24	U	
CHROMIUM	18.9			2.1	U		2.1	U	
COBALT	5.1			0.39	U		0.39	U	
COPPER	15.5	U	b	2.0	U		2.1	U	b
LEAD	5.4	U	b	1.2	U		1.7	U	b
MERCURY	0.15	U	b	0.085	U	b	0.15	U	b
MOLYBDENUM	17.1			1.3	U		1.3	U	
NICKEL	12.6			2.0	U		2.0	U	
SELENIUM	2.6	U		2.6	U		2.6	U	
SILVER	1.6	U	b	2.1	U	b	1.1	U	
THALLIUM	0.81	U		0.81	U		1.3	U	b
VANADIUM	30.5			0.65	U		0.65	U	
ZINC	44.2			3.6	J	g	5.2	J	g

Validity (Val):
U - Non-detected
UJ - Non-detected estimated
R - Rejected
J - Estimated concentration

NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery exceeded
b - Lab method blank contamination
c - Calibration exceeded
d - Duplicate precision exceeded
e - MS/LCS recovery exceeded
f - Field blank contamination
g - Quantification below reporting limit
h - Holding time exceeded
i - Internal standard exceeded
j - Other qualifications
y - Resembles a fuel pattern but does not match the standards
z - Does not resemble a fuel pattern (single peaks)

Project : FORT IRWIN
Laboratory : Applied Physics & Chemistry Laboratory

TPH EXTRACTABLES (DIESEL) ANALYSIS

Matrix : WATER

TtEMI Sample ID / Units	100-VLT630-019 (MG/L)			100-VLT630-024 (MG/L)			100-VLT630-028 (MG/L)		
Sample Location	DECON WATER IDW			FIELD BLANK			EQUIPMENT RINSATE 2		
Sample Depth (ft)	0.00 - 0.00			0.00 - 0.00			0.00 - 0.00		
Date Sampled / SDG Number	12/09/04 IDP02			12/09/04 IDP02			12/09/04 IDP02		
Date Extracted / Analyzed	12/13/04 01/05/05			12/13/04 12/14/04			12/13/04 12/15/04		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com
MOTOR OILS	0.48	U		0.48	U		0.48	U	
PHC AS DIESEL FUEL	0.48	U		0.48	U		0.48	U	

Validity (Val):
U - Non-detected
UJ - Non-detected estimated
R - Rejected
J - Estimated concentration

NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery exceeded
b - Lab method blank contamination
c - Calibration exceeded
d - Duplicate precision exceeded
e - MS/LCS recovery exceeded
f - Field blank contamination
g - Quantification below reporting limit
h - Holding time exceeded
i - Internal standard exceeded
j - Other qualifications
y - Resembles a fuel pattern but does not match the standards
z - Does not resemble a fuel pattern (single peaks)

Note :

TPH PURGEABLES (GASOLINE) ANALYSIS

Project FORT IRWIN
Laboratory : Applied Physics & Chemistry Laboratory

Matrix WATER

TtEMI Sample ID / Units	100-VLT630-019 (MG/L)			100-VLT630-021 (MG/L)			100-VLT630-024 (MG/L)			100-VLT630-028 (MG/L)		
Sample Location	DECON WATER IDW			TRIB BLANK 2			FIELD BLANK			EQUIPMENT RINSATE 2		
Sample Depth (ft)	0.00 - 0.00			0.00 - 0.00			0.00 - 0.00			0.00 - 0.00		
Date Sampled / SDG Number	12/09/04 IDP02			12/09/04 IDP02			12/09/04 IDP02			12/09/04 IDP02		
Date Extracted / Analyzed	12/10/04 12/10/04			12/10/04 12/10/04			12/10/04 12/10/04			12/10/04 12/10/04		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
PHC AS GASOLINE	0.05	U		0.05	U		0.05	U		0.05	U	

Validity (Val):
U - Non-detected
UJ - Non-detected estimated
R - Rejected
J - Estimated concentration

NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery exceeded
b - Lab method blank contamination
c - Calibration exceeded
d - Duplicate precision exceeded
e - MS/LCS recovery exceeded
f - Field blank contamination
g - Quantification below reporting limit
h - Holding time exceeded
i - Internal standard exceeded
j - Other qualifications
y - Resembles a fuel pattern but does not match the standards
z - Does not resemble a fuel pattern (single peaks)

Note

TtEMI Sample ID / Units	100-VLT630-019 (UG/L)			100-VLT630-021 (UG/L)			100-VLT630-024 (UG/L)			100-VLT630-028 (UG/L)		
Sample Location	DECON WATER IDW			TRIB BLANK 2			FIELD BLANK			EQUIPMENT RINSATE 2		
Sample Depth (ft)	0.00 - 0.00			0.00 - 0.00			0.00 - 0.00			0.00 - 0.00		
Date Sampled / SDG Number	12/09/04 IDP02			12/09/04 IDP02			12/09/04 IDP02			12/09/04 IDP02		
Date Analyzed	12/15/04			12/16/04			12/15/04			12/15/04		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
1,1,1,2-TETRACHLOROETHANE	0.5	U		0.5	U		0.5	U		0.5	U	
1,1,1-TRICHLOROETHANE	0.8	U		0.8	U		0.8	U		0.8	U	
1,1,2,2-TETRACHLOROETHANE	0.4	U		0.4	U		0.4	U		0.4	U	
1,1,2-TRICHLOROETHANE	1	U		1	U		1	U		1	U	
1,1-DICHLOROETHANE	0.4	U		0.4	U		0.4	U		0.4	U	
1,1-DICHLOROETHENE	0.5	U		0.5	U		0.5	U		0.5	U	
1,2,3-TRICHLOROPROPANE	3.2	U		3.2	U		3.2	U		3.2	U	
1,2-DICHLOROBENZENE	0.3	U		0.3	U		0.3	U		0.3	U	
1,2-DICHLOROETHANE	0.5	U		0.5	U		0.5	U		0.5	U	
1,2-DICHLOROPROPANE	0.4	U		0.4	U		0.4	U		0.4	U	
1,3-DICHLOROBENZENE	0.3	U		0.3	U		0.3	U		0.3	U	
1,4-DICHLOROBENZENE	0.3	U		0.3	U		0.3	U		0.3	U	
2-BUTANONE (MEK)	100	U		100	U		100	U		100	U	
2-HEXANONE	50	U		50	U		50	U		50	U	
4-METHYL-2-PENTANONE (MIBK)	100	U		100	U		100	U		100	U	
ACETONE	100	UJ	b,c	100	U		100	U		100	U	
ACRYLONITRILE	200	U		200	R	c	200	U		200	U	
BENZENE	0.4	U		0.4	U		0.4	U		0.4	U	
BROMOCHLOROMETHANE	0.4	U		0.4	U		0.4	U		0.4	U	
BROMODICHLOROMETHANE	0.8	U		0.8	U		0.95			0.83		
BROMOFORM	0.58	J	g	1.2	U		1.2	U		1.2	U	
BROMOMETHANE	1	U		1	U		1	U		1	U	
CARBON DISULFIDE	10	U		10	U		10	U		10	U	
CARBON TETRACHLORIDE	0.5	U		0.5	U		0.5	U		0.5	U	
CHLOROBENZENE	0.4	U		0.4	U		0.4	U		0.4	U	
CHLORODIBROMOMETHANE	0.69	U	f	0.5	U		0.67			0.60		
CHLOROETHANE	1	U		1	U		1	U		1	U	
CHLOROFORM	0.3	U		0.3	U		9.6			8.5		
CHLOROMETHANE	1.3	U		1.3	U		1.3	U		1.3	U	
CIS-1,2-DICHLOROETHENE	1.2	U		1.2	U		1.2	U		1.2	U	
CIS-1,3-DICHLOROPROPENE	0.5	U		0.5	U		0.5	U		0.5	U	
DIBROMOMETHANE	2.4	U		2.4	U		2.4	U		2.4	U	
DICHLORODIFLUOROMETHANE	1	U		1	U		1	U		1	U	

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R - Rejected
J - Estimated concentration

NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery exceeded
b - Lab method blank contamination
c - Calibration exceeded
d - Duplicate precision exceeded
e - MS/LCS recovery exceeded
f - Field blank contamination
g - Quantification below reporting limit
h - Holding time exceeded
i - Internal standard exceeded
j - Other qualifications
y - Resembles a fuel pattern but does not match the standards
z - Does not resemble a fuel pattern (single peaks)

Project : FORT IRWIN
Laboratory : Applied Physics & Chemistry Laboratory

VOA 8260 ANALYSIS

Matrix : WATER

TtEMI Sample ID / Units	100-VLT630-019 (UG/L)			100-VLT630-021 (UG/L)			100-VLT630-024 (UG/L)			100-VLT630-028 (UG/L)		
Sample Location	DECON WATER IDW			TRIB BLANK 2			FIELD BLANK			EQUIPMENT RINSATE 2		
Sample Depth (ft)	0.00 - 0.00			0.00 - 0.00			0.00 - 0.00			0.00 - 0.00		
Date Sampled / SDG Number	12/09/04 IDP02			12/09/04 IDP02			12/09/04 IDP02			12/09/04 IDP02		
Date Analyzed	12/15/04			12/16/04			12/15/04			12/15/04		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
ETHYLBENZENE	0.6	U		0.6	U		0.6	U		0.6	U	
F113	1	U		1	U		1	U		1	U	
IODOMETHANE	10	U		10	U		10	U		10	U	
METHYLENE CHLORIDE	1	U		1	U		1	U		1	U	b
STYRENE	0.4	U		0.4	U		0.4	U		0.4	U	
TETRACHLOROETHENE	1.4	U		1.4	U		1.4	U		1.4	U	
TOLUENE	1.1	U		1.1	U		1.1	U		1.1	U	
TRANS-1,2-DICHLOROETHENE	0.6	U		0.6	U		0.6	U		0.6	U	
TRANS-1,3-DICHLOROPROPENE	0.5	U		0.5	U		0.5	U		0.5	U	
TRANS-1,4-DICHLORO-2BUTENE	10	U		10	U		10	U		10	U	
TRICHLOROETHENE	1	U		1	U		1	U		1	U	
TRICHLOROFLUOROMETHANE	0.8	U		0.8	U		0.8	U		0.8	U	
VINYL ACETATE	50	R	c	50	U		50	R	c	50	R	c
VINYL CHLORIDE	1.1	U		1.1	U		1.1	U		1.1	U	
XYLENES (TOTAL)	2.9	U		2.9	U		2.9	U		2.9	U	

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Applicable Comments (Com):
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b - Lab method blank contamination
c - Calibration exceeded
d - Duplicate precision exceeded
e - MS/LCS recovery exceeded
f - Field blank contamination
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h - Holding time exceeded
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j - Other qualifications
y - Resembles a fuel pattern but does not match the standards
z - Does not resemble a fuel pattern (single peaks)

12/8/01

Tetra Tech EM Inc.
San Francisco Office

135 Main St. Suite 1800
San Francisco. CA 94105
415-543-4880
Fax 415-543-5480

Chain of Custody Record No. 7691

Page 1 of ____

Project name: Vault 630 Fort Irwin	**Lab PO#:**	**Lab:** PTS Laboratories	
Project (CTO) number: 100	**TtEMI technical contact:** John Swanson	**Field samplers:** Darren Croteau	
	TtEMI project manager: Tom AdKisson	**Field samplers' signatures:**	

Preservative Added

No./Container Types

Analysis Required

Sample ID	Sample Location (Pt. ID)	Date	Time	Matrix	MS / MSD	40 ml VOA	1 liter Amber	500 ml Poly	Sleeve	Glass Jar		VOA	SVOA	Pest/PCBs	Metals	TPH Purgeables	TPH Extractables	Hydraulic Conductivity Package
100-VLT630-009		12/9/04	11:22	Soil														X

	Name (print)	Company Name	Date	Time
Relinquished by:	Darren Croteau	Tetra Tech EMI	12/9/04	13:30
Received by: Fedex/Labmax 12-13-04 1700				
Relinquished by:				
Received by:				
Relinquished by:				
Received by:				

Turnaround time/remarks:

Fed Ex #:

WHITE-Laboratory Copy YELLOW-Sample Tracker PINK-File Copy

PTS Laboratories
ENVIRONMENTAL SERVICES

December 29, 2004

Mr. John Swanson
Tetra Tech
10670 White Rock Rd. St. 100
Rancho Cucamonga, CA 95670

Re: Vault 630 Fort Irwin
PTS File 34801

Dear Mr. Swanson:

Enclosed are final data for samples submitted from your Vault 630 Fort Irwin Project # 00. Electronic versions of the data have been previously sent to your attention. All analyses were performed by applicable ASTM, EPA or API methodology. The samples are currently in storage and will be held for thirty days before disposal.

We appreciate the opportunity to be of service and trust these data will prove beneficial in the development of this project. Please call me at (562) 907-3607 with any questions or if you require additional information.

Sincerely,
PTS Laboratories, Inc.

Larry Kunkel
District Manager

LAK:vk

Encl.

8100 Secura Way – Santa Fe Springs, CA 90670
Phone 562 907 3607 Fax 562 907 3610
www.ptsgeolabs.com

PTS Laboratories

Tetra Tech EM Inc.
PTS File No: 34801

PHYSICAL PROPERTIES DATA

PROJECT NAME: Vault 630 Fort Irwin
PROJECT NO: 100

	METHODOLOGY: ASTM D2216		API RP40		API RP40		API RP40	ASTM D5084	
								25.0 PSI CONFINING STRESS	
SAMPLE ID.	DEPTH, ft.	SAMPLE ORIENT. (1)	MOISTURE CONTENT (% wt)	DENSITY BULK (g/cc)	DENSITY GRAIN (g/cc)	POROSITY, %Vb (2) TOTAL	POROSITY, %Vb (2) AIR FILLED	TOTAL PORE FLUID SATURATIONS, (% Pv (3))	NATIVE STATE EFFECTIVE PERMEABILITY TO WATER (3,4) (millidarcy)	NATIVE STATE EFFECTIVE HYDRAULIC CONDUCTIVITY (3,4) (cm/s)
100-VLT630-009	N/A	V	6.74	1.56	2.62	40.5	30.0	25.9	1.21	1.13E-06

(1) Sample Orientation: H = horizontal; V = vertical (2) Total Porosity = no pore fluids in place; all interconnected pore channels; Air Filled = pore channels not occupied by pore fluids (3) Native State = As received with pore fluids in place (4) Permeability to water and conductivity measured at saturated conditions Vb = Bulk Volume, cc; ND = Not Detected

APPENDIX E

THIRD PARTY VALIDATION REPORT

DATA VALIDATION REPORT

Site:	Fort Irwin
Contract Task Order (CTO) No.:	G1058.3.4.01.139.01.02
Laboratory:	Applied P & Ch Laboratory
Data Reviewer:	Richard Amano, Stella Cuenco, Erlinda Rauto, Pei Geng, Mark Greg, Ming Hwang, and Steve Ziliak.
Firm/Proj. No:	Laboratory Data Consultants, Inc /13125A
Review Date:	February 8 through February 9, 2005
Sample Delivery Group (SDG) No.:	IDP01

Sample Nos.:			
100-VLT630-001*	100-VLT630-009	100-VLT630-017RE	100-VLT630-001DUP
100-VLT630-001RE*	100-VLT630-010	100-VLT630-020	100-VLT630-013MS
100-VLT630-002	100-VLT630-011	100-VLT630-022	100-VLT630-013MSD
100-VLT630-003	100-VLT630-012	100-VLT630-023*	100-VLT630-022MS
100-VLT630-003RE	100-VLT630-013	100-VLT630-001MS	100-VLT630-022MSD
100-VLT630-005	100-VLT630-017	100-VLT630-001MSD	

* Full Validation Sample

Matrix:	Soil and Water
Collection Date(s):	December 6 through December 8, 2004

The data were qualified according to the U.S. Army Corps of Engineers (USACE) document "Environmental Data Quality Management Program Specifications, USACE Sacramento District" (Version 1.08). Data validation requirements are presented below.

I certify that all data validation criteria outlined in the above referenced documents were assessed, and any qualifications made to the data were in accordance with those documents.

Certified by Richard Amano
Principal Chemist

DATA VALIDATION REQUIREMENTS

Full validation includes all parameters listed below. Cursory validation parameters are indicated by an asterisk (*).

CLP Organic Parameters

*	Holding times
	GC/MS instrument performance check
*	Initial and continuing calibrations
*	Blanks
*	Surrogate recovery
*	Matrix spike/matrix spike duplicate
*	Laboratory control sample or blank spike
*	Field duplicates
*	Internal standard performance
	Target compound identification
	Tentatively identified compounds
	Compound quantitation
	Reported detection limits
	System performance
*	Overall assessment of data for the SDG

CLP Inorganic Parameters

*	Holding times
*	Initial and continuing calibrations
*	Blanks
*	Matrix spike
*	Laboratory control sample or blank spike
*	Field duplicates
*	Matrix duplicates
	ICP interference check sample
	GFAA quality control
*	ICP serial dilution
	Sample result verification
	Analyte quantitation
	Reported detection limits
*	Overall assessment of data for the SDG

Non-CLP Organic and Inorganic Parameters

*	Method compliance
*	Holding times
*	Initial and continuing calibrations
*	Blanks
*	Matrix spike/matrix spike duplicate
*	Laboratory control sample or blank spike
*	Field duplicates
*	Matrix duplicates
*	Surrogate recovery
	Analyte quantitation
	Reported detection limits
*	Overall assessment of data for the SDG

DATA VALIDATION QUALIFIERS AND CODES

Data Validation Qualifiers

UJ Estimated nondetected result

J Estimated detected result

R Rejected result

NJ Tentatively Identified Compound (TIC)

Data Validation Qualifier Codes

a Surrogate recovery exceedance

b Laboratory method blank and common blank contamination

c Calibration exceedance

d Duplicate precision exceedance

e Matrix spike/laboratory control sample (LCS) recovery exceedance

f Field blank contamination

g Quantification below reporting limit

h Holding time exceedance

i Internal standard exceedance

j Other qualifications

TABLE 1
SAMPLE CROSS REFERENCE TABLE
SAMPLE DELIVERY GROUP IDP01

Sample ID	Matrix	Date Collected	Quality Control ID	Validation Criteria*	Analyses																	
					VOC (8260B)	SVOC (8270C)	PCB	METALS	TPPH	TEPH	pH											
100-VLT630-001	Soil	12/8/04	MS/MSD**	Full	X**	X	X	X**	X	X	X											
100-VLT630-002	Soil	12/8/04			X	X	X	X	X	X	X											
100-VLT630-003	Soil	12/8/04			X	X	X	X	X	X	X											
100-VLT630-005	Soil	12/8/04			X	X	X	X	X	X	X											
100-VLT630-009	Soil	12/8/04			X	X	X	X	X	X	X											
100-VLT630-010	Soil	12/8/04			X	X	X	X	X	X	X											
100-VLT630-011	Soil	12/8/04			X	X	X	X	X	X	X											
100-VLT630-012	Soil	12/8/04			X	X	X	X	X	X	X											
100-VLT630-013	Soil	12/8/04	MS/MSD**		X	X	X**	X	X	X**	X											
100-VLT630-017	Water	12/6/04			X	X	X	X	X	X												
100-VLT630-020	Water	12/7/04	Trip Blank		X				X													
100-VLT630-022	Water	12/7/04	Equipment Rinsate, MS/MSD**		X**	X	X	X	X	X												
100-VLT630-023	Soil	12/7/04		Full	X	X	X	X	X	X	X											

* = Cursory validation performed on all samples
** = MS/MSD/DUP performed on indicated parameters only
*** = Full review performed on indicated parameters only
DUP = Matrix duplicate
MS/MSD = Matrix Spike/Matrix Spike Duplicate
PCB = Polychlorinated Biphenyls
SVOC = Semivolatile Organic Compounds
TEPH = Total Extractable Petroleum Hydrocarbons
TPPH = Total Purgeable Petroleum Hydrocarbons
VOC = Volatile Organic Compounds

DATA ASSESSMENT

VOLATILE ORGANIC ANALYSIS (EPA SW 846 Method 8260B)

I. Holding Times

A. The 14 day analysis holding time requirement for soil and preserved waters was met.

II. Surrogate Recovery

A. The surrogate percent recoveries (%R) were within the QC limits with the exceptions listed below.

B. Due to surrogate recovery problems, the following detected and nondetected results are qualified as estimated (J-a/UJa).

- All volatile compounds in samples 100-VLT630-003 100-VLT630-003RE

The surrogates outside of QC limits are listed below.

Sample ID	Surrogate	%R	QC Limits
100-VLT630-003	Dibromofluoromethane	50	70-129%
100-VLT630-003RE	Dibromofluoromethane	52	70-129%

Low recoveries indicate that detected and nondetected results may be biased low.

III. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

A. The MS/MSD analysis was performed on samples 100-VLT630-001* and 100-VLT630-022. The percent recoveries (%R) and relative percent differences (RPD) were within the QC limits.

IV. Blank Spike or Laboratory Control Sample (LCS)

A. The LCS/LCSD QC samples were analyzed as required under the ITEMI SOW. The percent recoveries (%R) and relative percent differences (RPD) were within the QC limits.

V. Blank Contamination

A. Due to common laboratory contamination, the following results are considered nondetected (Ub).

• Methylene chloride in samples	100-VLT630-017	100-VLT630-020	100-VLT630-022
• Acetone in samples	100-VLT630-001*	100-VLT630-010	100-VLT630-022
	100-VLT630-003	100-VLT630-012	100-VLT630-023*
	100-VLT630-003RE	100-VLT630-017	

• 2-Butanone in samples	100-VLT630-001*	100-VLT630-022	100-VLT630-023*
	100-VLT630-010		

Acetone, Methylene chloride, and 2-Butanone are considered common laboratory contaminants when found at levels less than 5x the RL in environmental samples and not found in the associated blanks.

B. No volatile contaminants were found in the method blanks. No samples were qualified based on the volatile contaminants found in the equipment rinsate sample 100-VLT630-022. No volatile contaminants were found in the trip blank sample 100-VLT630-020.

VI. Calibrations

A. Initial calibration was performed using required standard concentrations. Percent relative standard deviations (%RSD) were less than or equal to 30.0% for all volatile compounds, the coefficients of determination (r^2) were ≥0.990, and all of the initial calibration RRF values were greater than or equal to 0.05 for all volatile compounds.

B. Continuing calibration was performed at the required frequencies as stated in the method. All of the continuing calibration percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were less than or equal to 25.0% and the initial calibration verification (ICV) percent differences (%D) were less than or equal to 25.0% with the exceptions listed below.

C. Due to continuing calibration problems, the following nondetected results are rejected (Rc).

• Vinyl acetate in samples	100-VLT630-017	100-VLT630-020	100-VLT630-022

The following continuing calibrations had percent differences (%D) of >50%.

Calibration Date	Compound	%D
12/15/04	Vinyl acetate	58.40

D. Due to continuing calibration problems, the following detected and nondetected results are qualified as estimated (J-c/UJc).

• Acetone in samples	100-VLT630-001*	100-VLT630-005	100-VLT630-012
	100-VLT630-002	100-VLT630-009	100-VLT630-013
	100-VLT630-003	100-VLT630-010	100-VLT630-023*
	100-VLT630-003RE	100-VLT630-011	

The following continuing calibrations had percent differences (%D) of >25%.

Calibration Date	Compound	%D
12/10/04	Acetone	39.32

VII. Internal Standards

A. All internal standard area counts were within -50% to +100% of the associated calibration standard and retention times were ±30 seconds of the associated calibration standard retention time.

VIII. Field Duplicate

A. No field duplicate samples were identified in this SDG.

IX. Other Qualifications

A. The following results are qualified as estimated (Jg).

- All VOA detected results reported below the RL.

Detected results reported below the RL are considered to be qualitatively acceptable, but quantitatively unreliable due to the uncertainty in analytical precision near the limit of detection.

Full Validation Criteria for Samples 100-VLT630-001* and 100-VLT630-023*

X. GC/MS Instrument Performance Checks

A. The ion abundance criteria were met for the bromofluorobenzene (BFB) GC/MS instrument performance check. The samples were analyzed within 12 hours of the associated instrument performance check.

XI. Target Compound List (TCL) Identification

A. The relative retention times, mass spectra, and peak identifications of the samples were evaluated. Target compound identification was considered to be correct.

XII. Compound Quantitation and Reported Detection Limits

A. Sample results were recalculated with the proper dilution factors, weights, volumes, and percent moisture used to calculate the sample results. The samples were found to be correctly quantitated. The reported detection limits were consistent with Tetra Tech EMI's required report limits and reflect any dilutions, weights, volumes, and percent moisture.

XIII. Tentatively Identified Compounds (TICs)

A. The TIC library searches were not performed for this SDG.

XIV. System Performance

A. The samples were evaluated for reconstructed ion chromatogram (RIC) baseline shifts, extraneous peaks, loss of resolution, and peak tailing. No system degradation was noted.

SEMIVOLATILE ORGANIC ANALYSIS (EPA SW 846 Method 8270C)

I. Holding Times

A. The 7 day extraction and 14 day extraction and 40 day analysis holding time requirements for waters and soils were met.

II. Surrogate Recovery

A. Surrogate percent recoveries (%R) were within QC limits.

III. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

A. The MS/MSD analysis was performed on sample 100-VLT630-027. The percent recoveries (%R) were within not the QC limits. Since the parent sample is not in this SDG, no data were qualified. The relative percent differences (RPD) were within not the QC limits.

IV. Blank Spike or Laboratory Control Sample (LCS)

A. The LCS/LCSD QC samples were analyzed as required under the ITEMI SOW. The percent recoveries (%R) and relative percent differences (RPD) were within the QC limits.

V. Blank Contamination

A. Due to common laboratory contamination, the following results are considered nondetected (Ub).

- Butylbenzylphthalate in samples 100-VLT630-023*
- Bis(2-ethylhexyl)phthalate in samples 100-VLT630-001* 100-VLT630-017 100-VLT630-023* 100-VLT630-005 100-VLT630-017RE

Dimethylphthalate, Diethylphthalate, Di-n-butylphthalate, Butylbenzylphthalate, Bis(2-ethylhexyl)phthalate, and Di-n-octylphthalate are considered common laboratory contaminants when found at levels less than 5x the CRQL in environmental samples and not found in the associated blanks.

B. No semivolatile contaminants were found in equipment rinsate sample 100-VLT630-022.

VI. Calibrations

A. Initial calibration was performed using required standard concentrations. Percent relative standard deviations (%RSD) were less than or equal to 30.0% for all semivolatile compounds, the coefficients of determination (r^2) were ≥0.990, and all of the initial calibration RRF values were greater than or equal to 0.05 for all semivolatile compounds.

B. Continuing calibration was performed at the required frequencies. All of the continuing calibration percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were less than or equal to 25.0%, the initial calibration verification (ICV) percent differences (%D) were less than or equal to 25.0%, and all of the continuing calibration RRF values were greater than or equal to 0.05 with the exceptions listed below.

C. Due to continuing calibration problems, the following nondetected results are qualified as estimated (UJc).

- 2,4-Dinitrophenol in sample 100-VLT630-001RE*

The following continuing calibrations had percent differences (%D) of >25%.

Calibration Date	Compound	%D
12/17/04	2,4-Dinitrophenol	33.76

D. The following continuing calibrations had percent differences (%D) of >25%.

Calibration Date	Compound	%D
12/16/04	Hexachlorocyclopentadiene	28.99

Although the above listed percent differences demonstrate a high bias, the associated sample results were nondetected and therefore were not qualified.

VII. Internal Standards

A. All internal standard area counts were within -50% to +100% of the associated calibration standard and retention times were ±30 seconds of the associated calibration standard retention time with the exceptions listed below.

B. Due to internal standard problems, the following detected and nondetected results are qualified as estimated (Ji/UJi).

- Di-n-octylphthalate, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Indeno(1,2,3-cd)pyrene, Benzo(g,h,i)perylene, and Dibenzo(a,h)anthracene in samples: 100-VLT630-001*, 100-VLT630-017, 100-VLT630-017RE

- Pyrene, Butylbenzylphthalate, 3,3'-Dichlorobenzidine, Benzo(a)anthracene, Bis(2-ethylhexyl)phthalate, and Chrysene in sample: 100-VLT630-017

The internal standard area counts in the samples listed above were less than one half of the reference standard and are listed below.

Sample ID	Internal Standard	Area	QC Limits
100-VLT630-001*	Perylene-d12	197865	212816-851266
100-VLT630-017	Chrysene-d12	229516	246236-492472
100-VLT630-017	Perylene-d12	125861	189501-758004
100-VLT630-017RE	Perylene-d12	223439	274193-1096772

Internal standard area counts of less than 50% of the standard area count may indicate a loss of instrument sensitivity.

VIII. Field Duplicate

A. No field duplicate samples were identified in this SDG.

IX. Other Qualifications

A. The following results are qualified as estimated (Jg).

- All SVOA detected results reported below the RL.

Detected results reported below the RL are considered to be qualitatively acceptable, but quantitatively unreliable due to the uncertainty in analytical precision near the limit of detection.

Full Validation Criteria for Samples 100-VLT630-001*, 100-VLT630-001RE, and 100-VLT630-023*

X. GC/MS Instrument Performance Checks

A. The ion abundance criteria were met for the decafluorotriphenylphosphine (DFTPP) GC/MS instrument performance checks. The samples were analyzed within 12 hours of the associated instrument performance check.

XI. Target Compound List (TCL) Identification

A. The relative retention times, mass spectra, and peak identifications of the samples were evaluated. Target compound identification was considered to be correct.

XII. Compound Quantitation and Reported Detection Limits

A. Sample results were recalculated, with the proper dilution factors, weights, volumes, and percent moisture used to calculate the sample results. The samples were found to be correctly quantitated. The reported detection limits were consistent with Tetra Tech EMI's required report limits and reflect any dilutions, weights, volumes, and percent moisture.

XIII. Tentatively Identified Compounds (TICs)

A. The TIC library searches were not performed for this SDG.

XIV. System Performance

A. The samples were evaluated for reconstructed ion chromatogram (RIC) baseline shifts, extraneous peaks, loss of resolution, and peak tailing. No system degradation was noted.

POLYCHLORINATED BIPHENYL (PCB) ANALYSIS (EPA SW 846 Method 8082)

I. Holding Times

A. The 7 day extraction and 14 day extraction and 40 day analysis holding time requirements for waters and soils were met with the exception listed below.

B. Due to holding time problems, the following detected and nondetected results are qualified as estimated (Jh/UJh).

- All PCB compounds in sample 100-VLT630-017

The extraction holding time of 7 days was exceeded by one day in the sample listed above.

II. Surrogate Recovery

A. Surrogate percent recoveries (%R) were within the QC limits with the exceptions listed below.

B. Due to surrogate recovery problems, the following detected and nondetected results are qualified as estimated (J-a/UJa).

- All PCB compounds in samples 100-VLT630-002 100-VLT630-003 100-VLT630-005

The surrogates outside of QC limits are listed below.

Sample ID	Surrogate	Col.1 % R	Col.2 % R	QC Limits
100-VLT630-002	Decachlorobiphenyl	19	-	60-140%
100-VLT630-002	Tetrachloro-m-xylene	38	-	60-140%
100-VLT630-003	Decachlorobiphenyl	59	-	60-140%
100-VLT630-005	Decachlorobiphenyl	58	-	60-140%
100-VLT630-005	Tetrachloro-m-xylene	54	-	60-140%

Low recoveries indicate that detected and nondetected results may be biased low.

III. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

A. The MS/MSD analysis was performed on sample 100-VLT630-013. The percent recoveries (%R) and relative percent differences (RPD) were within the QC limits.

IV. Blank Spike or Laboratory Control Sample (LCS)

A. The LCS QC samples were analyzed as required under the TTEMI SOW. The percent recoveries (%R) were within the QC limits.

V. Blank Contamination

A. Due to method blank contamination, the following results are considered nondetected (Ub).

• PCB-1016 in samples	100-VLT630-002	100-VLT630-012	100-VLT630-013
	100-VLT630-011		

The following compound was detected in the associated method blank at the concentration noted below.

Compound	Blank ID	Concentration
PCB-1016	04G4242MB01	2.6 ug/Kg

Detected results less than 5x the blank contamination were qualified.

B. No samples were qualified based on the PCB contaminants found in the equipment rinsate sample 100-VLT630-022.

VI. Calibrations

A. The initial calibration sequence was followed as required. Initial calibration of multicomponent compounds was performed for both columns at proper frequencies. The retention time windows were established according to the method.

B. The percent relative standard deviations (%RSD) of calibration factors for all compounds were within the 20.0% QC limits. The retention time windows were established according to the method. All required peaks for multicomponent compounds were present.

C. Continuing calibration sequence was followed as required. No more than 12 hours elapsed between continuing calibration analyses in an analytical sequence . The retention times (RT) of all compounds were within the QC limits. The percent differences (%D) of amount in Individual Mix standards were within the 15.0% QC limits. The percent differences (%D) in the initial calibration verification standards were within the 15.0% QC limits.

VII. Field Duplicate

A. No field duplicates were identified in this SDG.

VIII. Compound Identification

A. Due to confirmation problems, the following results are considered nondetected (UJj).

• PCB-1016 in samples	100-VLT630-002	100-VLT630-012	100-VLT630-017
	100-VLT630-011	100-VLT630-013	100-VLT630-022

The result reported was detected below the RL, and a percent difference (%D) greater than 25% was noted in the analyte concentration between the quantitation column and the confirmation column. Further review of the data determined that the result reported was a false positive. The %Ds are listed below.

Sample ID	Compound	%D
100-VLT630-002	PCB-1016	337
100-VLT630-011	PCB-1016	285
100-VLT630-012	PCB-1016	78
100-VLT630-013	PCB-1016	58
100-VLT630-017	PCB-1016	77
100-VLT630-022	PCB-1016	54

IX. Other Qualifications

A. The following results are qualified as estimated (Jg).

- All PCB detected results reported below the RL.

Detected results reported below the RL are considered to be qualitatively acceptable, but quantitatively unreliable due to the uncertainty in analytical precision near the limit of detection.

Full Validation Criteria for Samples 100-VLT630-001* and 100-VLT630-023*

X. Compound Quantitation and Reported Detection Limits

A. Sample results were recalculated, with the proper dilution factors, weights, volumes, and percent moisture used to calculate the sample results. The samples were found to be correctly quantitated. The reported detection limits were consistent with Tetra Tech EMI's required report limits and reflect any dilutions, weights, volumes, and percent moisture.

XI. System Performance

A. The samples were evaluated for baseline shifts, extraneous peaks, loss of resolution, and peak tailing. No system degradation was noted.

METALS ANALYSIS (by EPA SW 846 Method 6010B/7000)

I. Holding Times

A. The 6 month and 28 day holding time requirements were met for TAL Metals and Mercury, respectively.

II. Calibrations

A. All instruments were calibrated daily and the proper number of standards were used in accordance with the SW-846 Methods 6010B/7000.

B. All initial and continuing calibration verifications (ICV and CCV) recoveries were within the 90-110% QC Limits (80-120% for Mercury).

III. Blank Contamination

A. Due to calibration and method blank contamination, the following results are considered nondetected (Ub).

• Arsenic and Vanadium in sample	100-VLT630-022		
• Beryllium in sample	100-VLT630-011		
• Cadmium in samples	100-VLT630-001*	100-VLT630-010	100-VLT630-023*
	100-VLT630-003	100-VLT630-011	
• Mercury in samples	100-VLT630-001*	100-VLT630-010	100-VLT630-013
	100-VLT630-009	100-VLT630-012	100-VLT630-023*
• Selenium in samples	100-VLT630-003	100-VLT630-017	100-VLT630-022
• Silver and Thallium in sample	100-VLT630-017		
• Molybdenum in samples	100-VLT630-001*	100-VLT630-005	100-VLT630-009
	100-VLT630-002		

The following metals were detected in the associated calibration and method blanks at the concentrations noted below.

Analyte	Blank ID	Concentration, ug/L
Beryllium	ICB/CCB	0.094
Cadmium	ICB/CCB	0.376
Mercury	ICB/CCB	-0.210
Selenium	ICB/CCB	-6.227
Molybdenum	ICB/CCB	1.322
Arsenic	ICB/CCB	2.666
Selenium	ICB/CCB	-7.504
Silver	ICB/CCB	1.266

Analyte	Blank ID	Concentration, ug/L
Thallium	ICB/CCB	3.004
Vanadium	PB	0.55
Vanadium	ICB/CCB	1.003

Detected results less than 5x the maximum blank contamination were qualified.

B. No samples were qualified based on the metals contaminants found in the equipment rinsate sample 100-VLT630-022.

IV. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

A. The MS/MSD analyses were performed on sample 100-VLT630-001* and a non client sample for all metals. Percent recoveries (%R) were not within the 75-125% QC limits. Since the parent sample is a non-client sample, no data were qualified. The relative percent differences (RPD) were within the QC limits.

V. Matrix Duplicate (DUP)

A. The DUP analysis was performed on sample 100-VLT630-001* and a non client sample for all metals. Relative percent differences (RPD) and differences were within the QC limits.

VI. Laboratory Control Sample (LCS)

A. The LCS/LCSD QC samples were analyzed as required under the TTEMI SOW. The percent recoveries (%R) and relative percent differences (RPD) were within the QC limits.

VII. ICP Serial Dilution

A. Sample 100-VLT630-001* and a non-client sample were used for the ICP serial dilution analysis.

B. Due to ICP serial dilution problems, the following detected results are qualified as estimated (Jj).

• Copper and Lead in samples	100-VLT630-001*	100-VLT630-009	100-VLT630-012
	100-VLT630-002	100-VLT630-010	100-VLT630-013
	100-VLT630-003	100-VLT630-011	100-VLT630-023*
	100-VLT630-005		

The percent difference between the original sample result and the serial dilution result was outside the QC limits of 10% for analyte concentrations greater than 50x the MDL as shown below.

Sample ID	Analyte	Original Concentration	50x MDL	%D
100-VLT630-001*	Copper	138.167 ug/L	87.0 ug/L	12.5
100-VLT630-001*	Lead	105.582 ug/L	77.0 ug/L	13.9

VIII. Field Duplicate

A. No field duplicate samples were identified in this SDG.

IX. Other Qualifications

A. The following results are qualified as estimated (Jg).

- All metals results above the MDL but below the RL.

Results above the MDL but below the RL are considered qualitatively acceptable but quantitatively unreliable due to uncertainties in the analytical precision near the limit of detection.

Full Validation Criteria for Samples 100-VLT630-001* and 100-VLT630-023*

X. Analyte Quantitation and Reported Detection Limits

A. Sample results were recalculated, with the proper dilution factors, weights, volumes, and percent moisture used to calculate the sample results. The samples were found to be correctly quantitated. The reported detection limits were consistent with Tetra Tech EMI's required report limits and reflect any dilutions, weights, volumes, and percent moisture.

XI. Graphite Furnace Atomic Absorption (GFAA) Analysis

A. Graphite furnace atomic absorption analysis was not utilized in this SDG.

XII. ICP Interference Check Sample

A. Due to spectral interferences, the following detected and nondetected results are qualified as estimated (J+j/UJj).

- Arsenic, Silver, Thallium, Molybdenum, and Selenium in sample 100-VLT630-001*
- Arsenic, Thallium, Molybdenum, and Selenium in sample 100-VLT630-023*

Positive and negative results greater than the MDL for non-spiked analytes were reported for the ICSA solution. Further evaluation of the sample indicates that spectral interferences may exist due to a high concentration of Iron in the samples.

TPH GASOLINE (TPHG) ANALYSIS

I. Holding Times

A. The 14 day analysis holding time requirement for preserved waters and soils was met.

II. Surrogate Recovery

A. All surrogate recoveries (%R) were within the QC limits.

III. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

A. The MS/MSD analysis was not performed for this SDG. Although this is a protocol violation, the associated LCS/LCSD recoveries were within the QC limits and no data was qualified based on the lack of MS/MSD analysis.

IV. Blank Spike or Laboratory Control Sample (LCS)

A. The LCS/LCSD QC samples were analyzed as required under the TTEMI SOW. The percent recoveries (%R) and relative percent differences (RPD) were within the QC limits.

V. Blank Contamination

A. No samples were qualified based on the total petroleum hydrocarbons as gasoline contaminants found in the method blanks. No total petroleum hydrocarbons as gasoline contaminants were found in the trip blank sample 100-VLT630-020 or the equipment rinsate sample 100-VLT630-022.

VI. Calibrations

A. Initial calibration of compounds was performed as required by the method. The percent relative standard deviations (%RSD) of calibration factors for compounds were less than or equal to 20.0%.

B. Calibration verification was performed at required frequencies. The percent differences (%D) of amounts in continuing standard mixtures were within the 15.0% QC limits and the initial calibration verification (ICV) percent differences (%D) were within the 15.0% QC limits.

VII. Field Duplicate

A. No field duplicates were identified in this SDG.

VIII. Other Qualifications

A. The following results are qualified as estimated (Jg).

- All TPHG detected results reported below the Tetra Tech EMI required report limit (RL).

Detected results reported below the RL are considered to be qualitatively acceptable, but quantitatively unreliable due to the uncertainty in analytical precision near the limit of detection.

B. The following results are qualified as estimated (Z).

- All TPHG detected results flagged with a "Z" by the laboratory.

Detected results flagged Z by the laboratory indicate that the fuel pattern does not resemble TPH.

Full Validation Criteria for Samples 100-VLT630-001* and 100-VLT630-023*

IX. Compound Quantitation and Reported Detection Limits

A. Sample results were recalculated, with the proper dilution factors, weights, volumes, and percent moisture used to calculate the sample results. The samples were found to be correctly quantitated. The reported detection limits were consistent with Tetra Tech EMI's required report limits and reflect any dilutions, weights, volumes, and percent moisture.

X. System Performance

A. The samples were evaluated for baseline shifts, extraneous peaks, loss of resolution, and peak tailing. No system degradation was noted.

XI. Compound Identification

A. Target compound identification was considered to be correct for samples 100-VLT630-001* and 100-VLT630-023*.

TPH EXTRACTABLE (TPHE) ANALYSIS

I. Holding Times

A. The 14 day and 7 day extraction and 40 day analysis holding time requirements for soils and waters was met.

II. Surrogate Recovery

A. All surrogate recoveries (%R) were within the % QC limits.

III. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

A. The MS/MSD was performed on sample 100-VLT630-013. The percent recoveries (%R) and relative percent differences (RPD) were within the QC limits.

IV. Blank Spike or Laboratory Control Sample (LCS)

A. The LCS/LCSD QC samples were analyzed as required under the TTEMI SOW. The percent recoveries (%R) and relative percent differences (RPD) were within the QC limits.

V. Blank Contamination

A. No TPHE contaminants were found in the method blanks or the equipment rinsate sample 100-VLT630-022.

VI. Calibrations

A. Initial calibration of compounds was performed as required by the method. The percent relative standard deviations (%RSD) of calibration factors for compounds were less than or equal to 20.0%.

B. Calibration verification was performed at required frequencies. The percent differences (%D) of amounts in continuing standard mixtures were within the 15.0% QC limits and the initial calibration verification (ICV) percent differences (%D) were within the 15.0% QC limits.

VII. Field Duplicate

A. No field duplicates were identified in this SDG.

VIII. Other Qualifications

A. The following results are qualified as estimated (Jg).

- All TPHE detected results reported below the Tetra Tech EMI required report limit (RL).

Detected results reported below the RL are considered to be qualitatively acceptable, but quantitatively unreliable due to the uncertainty in analytical precision near the limit of detection.

B. The following results are qualified as estimated (D).

- All TPHE detected results flagged with a "D" by the laboratory.

Detected results flagged D by the laboratory indicate that the standard fuel pattern resembles diesel.

C. The following results are qualified as estimated (M).

- All TPHE detected results flagged with a "M" by the laboratory.

Detected results flagged M by the laboratory indicate that the standard fuel pattern resembles motor oil.

Full Validation Criteria for Samples 100-VLT630-001* and 100-VLT630-023*

IX. Compound Quantitation and Reported Detection Limits

A. Sample results were recalculated, with the proper dilution factors, weights, volumes, and percent moisture used to calculate the sample results. The samples were found to be correctly quantitated. The reported detection limits were consistent with Tetra Tech EMI's required report limits and reflect any dilutions, weights, volumes, and percent moisture.

X. System Performance

A. The samples were evaluated for baseline shifts, extraneous peaks, loss of resolution, and peak tailing. No system degradation was noted.

XI. Compound Identification

A. Target compound identification was considered to be correct for samples 100-VLT630-001* and 100-VLT630-023*.

NON-CLP INORGANIC AND PHYSICAL ANALYSIS

The following non-CLP inorganic and physical parameter was analyzed for: pH.

I. Holding Times

A. The 28 day analysis holding time requirement for pH (soils) was met.

II. Calibrations

A. All instruments were calibrated daily and the proper number of standards were used as required by the methods. All criteria were within the QC limits.

III. Blank Contamination

A. Method blanks analysis is not required for pH. No field blank samples were identified in this SDG.

IV. Matrix Spike (MS)

A. The MS/MSD analysis is not required for pH.

V. Matrix Duplicate (DUP)

A. The DUP analysis was performed on a non-client sample for pH. Relative percent differences (RPD) were within the ≤20% QC limits for inorganic analyses and the ≤10% QC limits for physical analyses.

VI. Laboratory Control Sample (LCS)

A. The LCS QC samples are not required for pH.

VII. Field Duplicate

A. No field duplicate samples were identified in this SDG.

VIII. Other Qualifications

A. No results were reported below the RL.

IX. Analyte Quantitation and Reported Detection Limits

A. Sample results were recalculated, with the proper dilution factors, weights, volumes, and percent moisture used to calculate the sample results. The samples were found to be correctly quantitated. The reported detection limits were consistent with Tetra Tech EMI's required report limits and reflect any dilutions, weights, volumes, and percent moisture.

OVERALL ASSESSMENT OF DATA

I. Method Compliance and Additional Comments

A. All analyses were conducted within all specifications of the requested methods with the exception listed below.

- For the TPHG analysis the MS/MSD analysis was not performed for this SDG. Although this is a protocol violation, the associated LCS/LCSD recoveries were within the QC limits and no data was qualified based on the lack of MS/MSD analysis.

II. Usability

SW 846 Volatile Organic Analysis

A. Due to severe problems in the instrument calibration in the volatile analysis, selected sample results were rejected. The findings were as follows:

- Due to continuing calibration %D problems, Vinyl acetate nondetected results were rejected in samples 100-VLT630-017, 100-VLT630-020, and 100-VLT630-022.

B. Due to surrogate, common laboratory contamination, and instrument calibration problems in the volatile analysis, several samples were qualified as estimated. The findings were as follows:

- Due to surrogate recovery problems, all volatile results were qualified as estimated in two samples.
- Due to common laboratory contamination problems, Methylene chloride was qualified nondetect in three samples, Acetone was qualified nondetect in eight samples, and 2-Butanone was qualified nondetect in four samples.
- Due to continuing calibration %D problems, Acetone results were qualified as estimated in eleven samples.
- All detected results reported below the RL were qualified as estimated.

C. Sample 100-VLT630-003 was reanalyzed due to surrogate recovery outside the QC limits. For sample 100-VLT630-003, all volatile results should be considered the most usable. Since the surrogate recovery was outside the QC limits, the volatile results for sample 100-VLT630-003RE should not be considered usable.

SW 846 Semivolatile Organic Analysis

A. No results for semivolatile analysis were rejected in this SDG.

B. Due to common laboratory contamination, instrument calibration, and internal standard problems in the semivolatile analysis, several samples were qualified as estimated. The findings were as follows:

- Due to common laboratory contamination problems, Butylbenzylphthalate was qualified nondetect in one sample and Bis(2-ethylhexyl)phthalate was qualified nondetect in five samples.

- Due to continuing calibration %D problems, 2,4-Dinitrophenol nondetected results were qualified as estimated in one sample.

- Due to internal standard area count problems, Di-n-octylphthalate, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Indeno(1,2,3-cd)pyrene, Benzo(g,h,i)perylene, and Dibenzo(a,h)anthracene nondetected results were qualified as estimated in three samples and Pyrene, Butylbenzylphthalate, 3,3'-Dichlorobenzidine, Benzo(a)anthracene, Bis(2-ethylhexyl)phthalate, and Chrysene results were qualified as estimated in one sample.

- All detected results reported below the RL were qualified as estimated.

C. Samples 100-VLT630-001* and 100-VLT630-017 were reextracted and reanalyzed due to internal standard area counts outside the QC limits. For sample 100-VLT630-001*, all semivolatile results except Di-n-octylphthalate, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Indeno(1,2,3-cd)pyrene, Benzo(g,h,i)perylene, and Dibenzo(a,h)anthracene should be considered the most usable. The Di-n-octylphthalate, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Indeno(1,2,3-cd)pyrene, Benzo(g,h,i)perylene, and Dibenzo(a,h)anthracene results for sample 100-VLT630-001RE* should be considered the most usable. For sample 100-VLT630-017, all semivolatile results should not be considered usable. The semivolatile results for sample 100-VLT630-017RE should be considered the most usable.

SW 846 PCB Analysis

A. No results for PCB analysis were rejected in this SDG.

B. Due to technical holding time, method blank contamination, surrogate, and compound identification problems in the PCB analysis, several samples were qualified as estimated. The findings were as follows:

- Due to technical holding time exceedance problems, all PCB results were qualified as estimated in one sample.

- Due to method blank contamination problems, PCB-1016 was qualified nondetect in four samples.

- Due to surrogate recovery problems, all PCB results were qualified as estimated in three samples.

- Due to compound identification problems, PCB-1016 detected results were qualified as nondetected in six samples.

- All detected results reported below the RL were qualified as estimated.

C. No samples were reextracted or reanalyzed for PCB analysis in this SDG.

SW 846 Metals Analysis

A. No results for metals analysis were rejected in this SDG.

B. Due to calibration and method blank contamination, ICP serial dilution, and ICP interference check sample analysis problems in the metals analysis, several samples were qualified as estimated. The findings were as follows:

- Due to calibration and method blank contamination problems, Arsenic, Beryllium, Silver, Thallium, and Vanadium were qualified nondetect in one sample, Cadmium was qualified nondetect in five samples, Mercury was qualified nondetect in six samples, and Selenium and Molybdenum were qualified nondetect in four samples.

- Due to ICP serial dilution %D problems, Copper and Lead detected results were qualified as estimated in ten samples.

- Due to ICP interference check sample problems, Silver nondetected results were qualified as estimated in one sample and Arsenic, Thallium, Molybdenum, and Selenium results were qualified as estimated in two samples.

- All detected results reported above the MDL but below the RL were qualified as estimated.

C. No samples were reextracted or reanalyzed for metals analysis in this SDG.

TPH Gasoline Analysis

A. No results for TPH gasoline analysis were rejected in this SDG.

B. Due to problems in the TPH gasoline analysis, several samples were qualified as estimated. The findings were as follows:

- All detected results reported below the RL were qualified as estimated.

- All detected results flagged with a "Z" by the laboratory were qualified as estimated.

C. No samples were reextracted or reanalyzed for TPH gasoline analysis in this SDG.

TPH Extractable Analysis

A. No results for TPH extractable analysis were rejected in this SDG.

B. Due to problems in the TPH extractable analysis, several samples were qualified as estimated. The findings were as follows:

- All detected results reported below the RL were qualified as estimated.

- All detected results flagged with a "D" or "M" by the laboratory were qualified as estimated.

C. No samples were reextracted or reanalyzed for TPH extractable analysis in this SDG.

Non-CLP Inorganic and Physical Analysis

A. No results for non-CLP inorganic and physical analysis were rejected in this SDG.

B. No samples were reextracted or reanalyzed for non-CLP inorganic and physical analysis in this SDG.

III. The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be estimated (J) are usable for limited purposes only. Sample results that were found to be rejected (R) are unusable for all purposes. Based upon the cursory and full data validation, all other results are considered valid and usable for all purposes.

DATA VALIDATION REPORT

Site:	Fort Irwin
Contract Task Order (CTO) No.:	G1058 3.4.01.139.01.02
Laboratory:	Applied P & Ch Laboratory
Data Reviewer:	Richard Amano, Stella Cuenco, Erlinda Rauto, Pei Geng, Mark Greg, Ming Hwang, and Steve Ziliak.
Firm/Proj. No:	Laboratory Data Consultants, Inc./13125B
Review Date:	February 8 through February 9, 2005
Sample Delivery Group (SDG) No.:	IDP02

Sample Nos.:				
	100-VLT630-018	100-VLT630-025	100-VLT630-018A	100-VLT630-027MSD
	100-VLT630-019	100-VLT630-026	100-VLT630-018MS	100-VLT630-028MS
	100-VLT630-021	100-VLT630-027	100-VLT630-018DUP	100-VLT630-028MSD
	100-VLT630-024	100-VLT630-028	100-VLT630-027MS	100-VLT630-028DUP

* Full Validation Sample

Matrix:	Soil and Water
Collection Date(s):	December 9, 2004

The data were qualified according to the U.S. Army Corps of Engineers (USACE) document "Environmental Data Quality Management Program Specifications, USACE Sacramento District" (Version 1.08). Data validation requirements are presented below.

I certify that all data validation criteria outlined in the above referenced documents were assessed, and any qualifications made to the data were in accordance with those documents.

Stella Cuenco

Certified by Richard Amano
Principal Chemist

DATA VALIDATION REQUIREMENTS

Full validation includes all parameters listed below. Cursory validation parameters are indicated by an asterisk (*).

CLP Organic Parameters

* Holding times
GC/MS instrument performance check
* Initial and continuing calibrations
* Blanks
* Surrogate recovery
* Matrix spike/matrix spike duplicate
* Laboratory control sample or blank spike
* Field duplicates
* Internal standard performance
Target compound identification
Tentatively identified compounds
Compound quantitation
Reported detection limits
System performance
* Overall assessment of data for the SDG

CLP Inorganic Parameters

* Holding times
* Initial and continuing calibrations
* Blanks
* Matrix spike
* Laboratory control sample or blank spike
* Field duplicates
* Matrix duplicates
ICP interference check sample
GFAA quality control
* ICP serial dilution
Sample result verification
Analyte quantitation
Reported detection limits
* Overall assessment of data for the SDG

Non-CLP Organic and Inorganic Parameters

* Method compliance
* Holding times
* Initial and continuing calibrations
* Blanks
* Matrix spike/matrix spike duplicate
* Laboratory control sample or blank spike
* Field duplicates
* Matrix duplicates
* Surrogate recovery
Analyte quantitation
Reported detection limits
* Overall assessment of data for the SDG

DATA VALIDATION QUALIFIERS AND CODES

Data Validation Qualifiers

UJ Estimated nondetected result

J Estimated detected result

R Rejected result

NJ Tentatively Identified Compound (TIC)

Data Validation Qualifier Codes

a Surrogate recovery exceedance

b Laboratory method blank and common blank contamination

c Calibration exceedance

d Duplicate precision exceedance

e Matrix spike/laboratory control sample (LCS) recovery exceedance

f Field blank contamination

g Quantification below reporting limit

h Holding time exceedance

i Internal standard exceedance

j Other qualifications

TABLE 1
SAMPLE CROSS REFERENCE TABLE
SAMPLE DELIVERY GROUP IDP02

Sample ID	Matrix	Date Collected	Quality Control ID	Validation Criteria*	Analyses																
					VOC (8260B)	SVOC (8270C)	PCB	METALS	TPPH	TEPH	pH	FLASHPOINT	REACTIVE CYANIDE	REACTIVE SULFIDE							
100-VLT630-018	Soil	12/9/04	MS/DUP**		X	X	X	X	X	X	X	X**	X**	X**							
100-VLT630-019	Water	12/9/04			X	X	X	X	X	X											
100-VLT630-021	Water	12/9/04	Trip Blank		X				X												
100-VLT630-024	Water	12/9/04	Field Blank		X	X	X	X	X	X											
100-VLT630-025	Soil	12/9/04			X	X	X	X	X	X	X										
100-VLT630-026	Soil	12/9/04			X	X	X	X	X	X	X										
100-VLT630-027	Soil	12/9/04	MS/MSD**		X	X**	X	X	X	X	X										
100-VLT630-028	Water	12/9/04	Equipment Rinsate, MS/MSD/DUP**		X	X	X	X**	X	X											
100-VLT630-018A	Soil	12/9/04			X	X	X	X	X	X	X	X	X	X							

* = Cursory validation performed on all samples
** = MS/MSD/DUP performed on indicated parameters only
*** = Full review performed on indicated parameters only
DUP = Matrix duplicate
MS/MSD = Matrix Spike/Matrix Spike Duplicate
PCB = Polychlorinated Biphenyls
SVOC = Semivolatile Organic Compounds
TEPH = Total Extractable Petroleum Hydrocarbons
VOC = Volatile Organic Compounds
TPPH = Total Purgeable Petroleum Hydrocarbons

DATA ASSESSMENT

VOLATILE ORGANIC ANALYSIS (EPA SW 846 Method 8260B)

I. Holding Times

A. The 14 day analysis holding time requirement for soil and preserved waters was met.

II. Surrogate Recovery

A. The surrogate percent recoveries (%R) were within the QC limits.

III. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

A. The MS/MSD analysis was performed on samples 100VLT630-001 and 100VLT630-022. The percent recoveries (%R) and relative percent differences (RPD) were within the QC limits.

IV. Blank Spike or Laboratory Control Sample (LCS)

A. The LCS QC samples were analyzed as required under the TTEMI SOW. The percent recoveries (%R)) were within the QC limits.

V. Blank Contamination

A. Due to common laboratory contamination, the following results are considered nondetected (Ub).

• Methylene chloride in samples	100-VLT630-018	100-VLT630-026	100-VLT630-028
	100-VLT630-025	100-VLT630-027	100-VLT630-018A
• Acetone in sample	100-VLT630-019		

Acetone, Methylene chloride, and 2-Butanone are considered common laboratory contaminants when found at levels less than 5x the RL in environmental samples and not found in the associated blanks.

B. No volatile contaminants were found in the method blanks. No volatile contaminants were found in the trip blank sample 100-VLT630-021.

C. Due to field blank and equipment rinsate contamination, the following results are considered nondetected (Uf).

• Chloroform in samples	100-VLT630-018	100-VLT630-026	100-VLT630-018A
	100-VLT630-025	100-VLT630-027	
• Dibromochloromethane in sample	100-VLT630-019		

The following compounds were detected in the associated field blank or equipment rinsate at the concentrations noted below.

Blank ID	Compound	Concentration, µg/L
100-VLT630-024 (field blank)	Chloroform	9.6
100-VLT630-024 (field blank)	Dibromochloromethane	0.67
100-VLT630-028 (equipment rinsate)	Chloroform	8.5
100-VLT630-028 (equipment rinsate)	Dibromochloromethane	0.60

Detected results less than 5x the blank contamination were qualified.

VI. Calibrations

A. Initial calibration was performed using required standard concentrations. Percent relative standard deviations (%RSD) were less than or equal to 30.0% for all volatile compounds, the coefficients of determination (r^2) were ≥0.990, and all of the initial calibration RRF values were greater than or equal to 0.05 for all volatile compounds.

B. Continuing calibration was performed at the required frequencies as stated in the method. All of the continuing calibration percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were less than or equal to 25.0% and the initial calibration verification (ICV) percent differences (%D) were less than or equal to 25.0% with the exceptions listed below.

C. Due to continuing calibration problems, the following nondetected results are rejected (Rc).

- Acrylonitrile in sample 100-VLT630-021

The relative response factors which did not meet the QC limit of ≥ 0.05 are listed below.

Calibration Date	Compound	RRF
12/16/04	Acrylonitrile	0.048

D. Due to continuing calibration problems, the following nondetected results are rejected (Rc).

- Vinyl acetate in samples 100-VLT630-019 100-VLT630-024 100-VLT630-028

The following continuing calibrations had percent differences (%D) of >50%.

Calibration Date	Compound	%D
12/15/04 (G4279Q01)	Vinyl acetate	68.94
12/15/04 (G4270Q01)	Vinyl acetate	58.40

E. Due to continuing calibration problems, the following nondetected results are qualified as estimated (UJc).

- Acetone in samples 100-VLT630-018 100-VLT630-026 100-VLT630-018A
  100-VLT630-025 100-VLT630-027

The following continuing calibrations had percent differences (%D) of >25%.

Calibration Date	Compound	%D
12/10/04	Acetone	39.32

F. Due to continuing calibration problems, the following detected results are qualified as estimated (J+c).

- Acetone in sample 100-VLT630-019

The following continuing calibrations had percent differences (%D) of >25%.

Calibration Date	Compound	%D
12/15/04	Acetone	26.79

VII. Internal Standards

A. All internal standard area counts were within -50% to +100% of the associated calibration standard and retention times were ±30 seconds of the associated calibration standard retention time.

VIII. Field Duplicate

A. No field duplicate samples were identified in this SDG.

IX. Other Qualifications

A. The following results are qualified as estimated (Jg).

- All VOA detected results reported below the RL.

Detected results reported below the RL are considered to be qualitatively acceptable, but quantitatively unreliable due to the uncertainty in analytical precision near the limit of detection.

SEMIVOLATILE ORGANIC ANALYSIS (EPA SW 846 Method 8270C)

I. Holding Times

A. The 7 day extraction and 14 day extraction and 40 day analysis holding time requirements for waters and soils were met.

II. Surrogate Recovery

A. Surrogate percent recoveries (%R) were within QC limits.

III. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

A. The MS/MSD analysis was performed on sample 100-VLT630-027. The percent recoveries (%R) and relative percent differences (RPD) were within the QC limits with the exceptions listed below.

B. The recoveries that did not meet the QC limits are listed below.

Sample ID	Compound	MS %R	MSD %R	QC Limits
100-VLT630-027	2,4-Dinitrtoluene	117	-	42-115%
100-VLT630-027	4-Nitrophenol	110	-	11-105%

Although the above listed percent recoveries demonstrate a high bias, the associated sample results were nondetected and therefore were not qualified.

IV. Blank Spike or Laboratory Control Sample (LCS)

A. The LCS/LCSD QC samples were analyzed as required under the ITEMI SOW. The percent recoveries (%R) and relative percent differences (RPD) were within the QC limits.

V. Blank Contamination

A. Due to common laboratory contamination, the following results are considered nondetected (Ub).

- Bis(2-ethylhexyl)phthalate in samples 100-VLT630-018 100-VLT630-028

Dimethylphthalate, Diethylphthalate, Di-n-butylphthalate, Butylbenzylphthalate, Bis(2-ethylhexyl)phthalate, and Di-n-octylphthalate are considered common laboratory contaminants when found at levels less than 5x the CRQL in environmental samples and not found in the associated blanks.

B. No semivolatile contaminants were found in the field blank sample 100-VLT630-024 or the equipment rinsate sample 100-VLT630-028.

VI. Calibrations

A. Initial calibration was performed using required standard concentrations. Percent relative standard deviations (%RSD) were less than or equal to 30.0% for all semivolatile compounds, the coefficients of determination (r^2) were ≥0.990, and all of the initial calibration RRF values were greater than or equal to 0.05 for all semivolatile compounds.

B. Continuing calibration was performed at the required frequencies. All of the continuing calibration percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were less than or equal to 25.0%, the initial calibration verification (ICV) percent differences (%D) were less than or equal to 25.0%, and all of the continuing calibration RRF values were greater than or equal to 0.05 with the exceptions listed below.

C. The following continuing calibrations had percent differences (%D) of >25% .

Calibration Date	Compound	%D
12/16/04	Hexachlorocyclopentadiene	28.99

Although the above listed percent differences demonstrate a high bias, the associated sample results were nondetected and therefore were not qualified.

VII. Internal Standards

A. All internal standard area counts were within -50% to +100% of the associated calibration standard and retention times were ±30 seconds of the associated calibration standard retention time.

VIII. Field Duplicate

A. No field duplicate samples were identified in this SDG.

IX. Other Qualifications

A. The following results are qualified as estimated (Jg).

- All SVOA detected results reported below the RL.

Detected results reported below the RL are considered to be qualitatively acceptable, but quantitatively unreliable due to the uncertainty in analytical precision near the limit of detection.

POLYCHLORINATED BIPHENYL (PCB) ANALYSIS (EPA SW 846 Method 8082)

I. Holding Times

A. The 7 day extraction and 14 day extraction and 40 day analysis holding time requirements for waters and soils were met.

II. Surrogate Recovery

A. Surrogate percent recoveries (%R) were within the QC limits.

III. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

A. The MS/MSD analysis was performed on sample 100-VLT630-013. The percent recoveries (%R) and relative percent differences (RPD) were within the QC limits.

IV. Blank Spike or Laboratory Control Sample (LCS)

A. The LCS/LCSD QC samples were analyzed as required under the TTEMI SOW. The percent recoveries (%R) and relative percent differences (RPD) were within the QC limits.

V. Blank Contamination

A. Due to method blank contamination, the following results are considered nondetected (Ub).

- PCB-1016 in samples 100-VLT630-018 100-VLT630-027 100-VLT630-018A 100-VLT630-025

The following compound was detected in the associated method blank at the concentration noted below.

Compound	Blank ID	Concentration
PCB-1016	04G4242MB01	2.6 ug/Kg

Detected results less than 5x the blank contamination were qualified.

B. Due to field blank and equipment rinsate contamination, the following results are considered nondetected (Uf).

- PCB-1016 in sample 100-VLT630-019

The following compound was detected in the associated field blank and equipment rinsate at the concentrations noted below.

Blank ID	Compound	Concentration, µg/L
100-VLT630-024 (field blank)	PCB-1016	0.075

Blank ID	Compound	Concentration, µg/L
100-VLT630-028 (equipment rinsate)	PCB-1016	0.12

Detected results less than 5x the maximum blank contamination were qualified.

VI. Calibrations

A. The initial calibration sequence was followed as required. Initial calibration of multicomponent compounds was performed for both columns at proper frequencies. The retention time windows were established according to the method.

B. The percent relative standard deviations (%RSD) of calibration factors for all compounds were within the 20.0% QC limits. The retention time windows were established according to the method. All required peaks for multicomponent compounds were present.

C. Continuing calibration sequence was followed as required. No more than 12 hours elapsed between continuing calibration analyses in an analytical sequence . The retention times (RT) of all compounds were within the QC limits. The percent differences (%D) of amount in Individual Mix standards were within the 15.0% QC limits. The percent differences (%D) in the initial calibration verification standards were within the 15.0% QC limits.

VII. Field Duplicate

A. No field duplicates were identified in this SDG.

VIII. Compound Identification

A. Due to confirmation problems, the following results are considered nondetected (UJj).

- PCB-1016 in sample 100-VLT630-024

The result reported was detected below the RL, and a percent difference (%D) greater than 25% was noted in the analyte concentration between the quantitation column and the confirmation column. Further review of the data determined that the result reported was a false positive. The %Ds are listed below.

Sample ID	Compound	%D
100-VLT630-024	PCB-1016	109

IX. Other Qualifications

A. The following results are qualified as estimated (Jg).

- All PCB detected results reported below the RL.

Detected results reported below the RL are considered to be qualitatively acceptable, but quantitatively unreliable due to the uncertainty in analytical precision near the limit of detection.

METALS ANALYSIS (by EPA SW 846 Method 6010B/7000)

I. Holding Times

A. The 6 month and 28 day holding time requirements were met for TAL Metals and Mercury, respectively.

II. Calibrations

A. All instruments were calibrated daily and the proper number of standards were used in accordance with the SW 846 Methods 6010B/7000.

B. All initial and continuing calibration verifications (ICV and CCV) recoveries were within the 90-110% QC Limits (80-120% for Mercury).

III. Blank Contamination

A. Due to calibration and method blank contamination, the following results are considered nondetected (Ub).

- Antimony and Arsenic in sample 100-VLT630-019
- Barium in samples 100-VLT630-024 100-VLT630-028
- Cadmium in sample 100-VLT630-018A
- Copper and Lead in samples 100-VLT630-019 100-VLT630-028
- Mercury in samples 100-VLT630-019 100-VLT630-024 100-VLT630-028
- Selenium in sample 100-VLT630-027
- Silver in samples 100-VLT630-019 100-VLT630-024
- Thallium in sample 100-VLT630-028

The following metals were detected in the associated calibration and method blanks at the concentrations noted below.

Analyte	Blank ID	Concentration
Antimony	ICB/CCB	3.656 ug/L
Arsenic	PBW	1.5 ug/L
Arsenic	ICB/CCB	2.629 ug/L
Barium	ICB/CCB	1.657 ug/L
Cadmium	PBS	0.020 mg/Kg
Cadmium	ICB/CCB	0.565 ug/L
Copper	ICB/CCB	4.732 ug/L
Lead	ICB/CCB	1.743 ug/L
Mercury	PBW	0.069 ug/L

Analyte	Blank ID	Concentration
Mercury	ICB/CCB	0.070 ug/L
Selenium	ICB/CCB	-6.204 ug/L
Silver	PBW	1.7 ug/L
Silver	ICB/CCB	2.438 ug/L
Thallium	ICB/CCB	3.762 ug/L

Detected results less than 5x the maximum blank contamination were qualified.

B. No samples were qualified based on the metals contaminants found in the field blank sample 100-VLT630-024 or the equipment rinsate sample 100-VLT630-028.

IV. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

A. The MS/MSD analyses were performed on sample 100-VLT630-028 and a non client sample for all metals. Percent recoveries (%R) were not within the 75-125% QC limits. Since the parent sample is a non-client samle, no data were qualified. The relative percent differences (RPD) were within the QC limits.

V. Matrix Duplicate (DUP)

A. The DUP analysis was performed on sample 100-VLT630-028 and a non client sample for all metals. Relative percent differences (RPD) and differences were within the QC limits.

VI. Laboratory Control Sample (LCS)

A. The LCS/LCSD QC samples were analyzed as required under the TTEMI SOW. The percent recoveries (%R) and relative percent differences (RPD) were within the QC limits.

VII. ICP Serial Dilution

A. A non-client sample was used for the ICP serial dilution analysis. The percent difference between the original sample result and the serial dilution result was not within the QC limits of 10% for analyte concentrations greater than 50x the MDL. Since the parent sample is a non-client sample, no data were qualified.

VIII. Field Duplicate

A. No field duplicate samples were identified in this SDG.

IX. Other Qualifications

A. The following results are qualified as estimated (Jg).

- All metals results above the MDL but below the RL.

Results above the MDL but below the RL are considered qualitatively acceptable but quantitatively unreliable due to uncertainties in the analytical precision near the limit of detection.

TPH GASOLINE (TPHG) ANALYSIS

I. Holding Times

A. The 14 day analysis holding time requirement for preserved waters and soils was met.

II. Surrogate Recovery

A. All surrogate recoveries (%R) were within the QC limits.

III. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

A. The MS/MSD analysis was not performed for this SDG. Although this is a protocol violation, the associated LCS/LCSD recoveries were within the QC limits and no data was qualified based on the lack of MS/MSD analysis.

IV. Blank Spike or Laboratory Control Sample (LCS)

A. The LCS/LCSD QC samples were analyzed as required under the ITEMI SOW. The percent recoveries (%R) and relative percent differences (RPD) were within the QC limits.

V. Blank Contamination

A. No samples were qualified based on the total petroleum hydrocarbons as gasoline contaminants found in the method blanks. No total petroleum hydrocarbons as gasoline contaminants were found in the trip blank sample 100-VLT630-021, the field blank sample 100-VLT630-024, or the equipment rinsate sample 100-VLT630-028.

VI. Calibrations

A. Initial calibration of compounds was performed as required by the method. The percent relative standard deviations (%RSD) of calibration factors for compounds were less than or equal to 20.0%.

B. Calibration verification was performed at required frequencies. The percent differences (%D) of amounts in continuing standard mixtures were within the 15.0% QC limits and the initial calibration verification (ICV) percent differences (%D) were within the 15.0% QC limits.

VII. Field Duplicate

A. No field duplicates were identified in this SDG.

VIII. Other Qualifications

A. No results were reported below the Tetra Tech EMI required report limit (RL).

TPH EXTRACTABLE (TPHE) ANALYSIS

I. Holding Times

A. The 14 day and 7 day extraction and 40 day analysis holding time requirements for soils and waters was met.

II. Surrogate Recovery

A. All surrogate recoveries (%R) were within the % QC limits.

III. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

A. The MS/MSD analysis was not performed for this SDG. Although this is a protocol violation, the associated LCS/LCSD recoveries were within the QC limits and no data was qualified based on the lack of MS/MSD analysis.

IV. Blank Spike or Laboratory Control Sample (LCS)

A. The LCS/LCSD QC samples were analyzed as required under the ITEMI SOW. The percent recoveries (%R) and relative percent differences (RPD) were within the QC limits.

V. Blank Contamination

A. No TPHE contaminants were found in the method blanks, the field blank sample 100-VLT630-024, or the equipment rinsate sample 100-VLT630-028.

VI. Calibrations

A. Initial calibration of compounds was performed as required by the method. The percent relative standard deviations (%RSD) of calibration factors for compounds were less than or equal to 20.0% .

B. Calibration verification was performed at required frequencies. The percent differences (%D) of amounts in continuing standard mixtures were within the 15.0% QC limits and the initial calibration verification (ICV) percent differences (%D) were within the 15.0% QC limits.

VII. Field Duplicate

A. No field duplicates were identified in this SDG.

VIII. Other Qualifications

A. The following results are qualified as estimated (Jg).

- All TPHE detected results reported below the Tetra Tech EMI required report limit (RL).

Detected results reported below the RL are considered to be qualitatively acceptable, but quantitatively unreliable due to the uncertainty in analytical precision near the limit of detection.

B. The following results are qualified as estimated (D).

- All TPHE detected results flagged with a "D" by the laboratory.

Detected results flagged D by the laboratory indicate that the standard fuel pattern resembles diesel.

C. The following results are qualified as estimated (M).

- All TPHE detected results flagged with a "M" by the laboratory.

Detected results flagged M by the laboratory indicate that the standard fuel pattern resembles motor oil.

NON-CLP INORGANIC AND PHYSICAL ANALYSIS

The following non-CLP inorganic and physical parameters were analyzed for: Flashpoint, pH, Reactive Cyanide, and Reactive Sulfide.

I. Holding Times

A. The 28 day analysis holding time requirement for pH (soils), the 14 day analysis holding time requirement for Flashpoint and Reactive Cyanide, and the 7 day analysis holding time requirement for Reactive Sulfide were met.

II. Calibrations

A. All instruments were calibrated daily and the proper number of standards were used as required by the methods. All Initial and Continuing calibration verifications were performed at the proper frequency and percent recoveries (%R) were within the 90-110% QC limits and all initial calibration correlation coefficients were ≥ to 0.995.

III. Blank Contamination

A. No contaminant concentrations were detected in the method blanks. No field blank samples were identified in this SDG.

IV. Matrix Spike (MS)

A. The MS analysis was performed on sample 100-VLT630-018 for Reactive Cyanide and Reactive Sulfide. Percent recoveries (%R) were within the QC limits and relative percent differences (RPD) were within the ≤20% QC limits for inorganic analyses and the ≤10% QC limits for physical analysis with the exceptions listed below.

B. Due to a severe problem in the MS analysis, the following nondetected results are rejected (Re).

- Reactive Cyanide in samples 100-VLT630-018 100-VLT630-018A

The recoveries that did not meet the QC limits are listed below.

Sample ID	Analyte	%R	QC Limits
100-VLT630-018	Reactive Cyanide	3	75-125%

Spike recoveries below 30% indicate that detects may be biased low and false nondetects may have been reported.

C. Due to accuracy problems in the MS analysis, the following nondetected results are qualified as estimated (UJe).

- Reactive Sulfide in samples 100-VLT630-018 100-VLT630-018A

The recoveries that did not meet the QC limits are listed below.

Sample ID	Analyte	%R	QC Limits
100-VLT630-018	Reactive Sulfide	35	75-125%

Spike recoveries between 30-74% indicate that detects may be biased low and false nondetects may have been reported.

V. Matrix Duplicate (DUP)

A. The DUP analysis was not performed for this SDG. Although this is a protocol violation, the associated LCS/LCSD relative percent differences (RPD) were within the QC limits and no data was qualified based on the lack of DUP analysis

VI. Laboratory Control Sample (LCS)

A. The LCS/LCSD QC samples were analyzed as required under the TTEMI SOW. The percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the exceptions listed below.

B. Due to a problem in the LCS/LCSD, the following nondetected results are rejected (Re).

- Reactive Cyanide in samples 100-VLT630-018 100-VLT630-018A

The results obtained in the analysis of the LCS/LCSD which were not within the control limits are shown below.

LCS ID	Analyte	LCS % R	LCSD % R	QC Limits	RPD	QC Limits
LCS/LCSD	Reactive Cyanide	3	3	80-120%	-	-

LCS/LCSD percent recoveries below 50% indicate a severe deficiency in the preparation and analysis of the samples.

C. Due to a problem in the LCS/LCSD, the following nondetected results are qualified as estimated (UJe).

- Reactive Sulfide in samples 100-VLT630-018 100-VLT630-018A

The results obtained in the analysis of the LCS/LCSD which were not within the control limits are shown below.

LCS ID	Analyte	LCS % R	LCSD % R	QC Limits	RPD	QC Limits
LCS/LCSD	Reactive Sulfide	34	38	80-120%	-	-

Detected results may be biased low and false nondetects may have been reported.

VII. Field Duplicate

A. No field duplicate samples were identified in this SDG.

VIII. Other Qualifications

A. No results were reported below the RL.

OVERALL ASSESSMENT OF DATA

I. Method Compliance and Additional Comments

A. All analyses were conducted within all specifications of the requested methods with the exception listed below.

- For the TPHG and TPHE analyses, the MS/MSD analysis was not performed for this SDG. Although this is a protocol violation, the associated LCS/LCSD recoveries were within the QC limits and no data was qualified based on the lack of MS/MSD analysis.
- For the non-CLP inorganic and physical analysis, the DUP analysis was not performed for this SDG. Although this is a protocol violation, the associated LCS/LCSD relative percent differences (RPD) were within the QC limits and no data was qualified based on the lack of DUP analysis.

II. Usability

SW 846 Volatile Organic Analysis

A. Due to severe problems in the instrument calibration in the volatile analysis, selected sample results were rejected. The findings were as follows:

- Due to continuing calibration RRF problems, Acrylonitrile nondetected results were rejected in sample 100-VLT630-021.
- Due to continuing calibration %D problems, Vinyl acetate nondetected results were rejected in samples 100-VLT630-019, 100-VLT630-024, and 100-VLT630-028.

B. Due to common laboratory and field blank contamination and instrument calibration problems in the volatile analysis, several samples were qualified as estimated. The findings were as follows:

- Due to common laboratory contamination problems, Methylene chloride was qualified nondetect in six samples and Acetone was qualified nondetect in one sample.
- Due to field blank and equipment rinsate contamination problems, Chloroform was qualified nondetect in five samples and Dibromochloromethane was qualified nondetect in one sample.
- Due to continuing calibration %D problems, Acetone nondetected results were qualified as estimated in one sample and Acetone detected results were qualified as estimated in five samples.
- All detected results reported below the RL were qualified as estimated.

C. No samples were reextracted or reanalyzed for volatile analysis in this SDG.

SW 846 Semivolatile Organic Analysis

A. No results for semivolatile analysis were rejected in this SDG.

B. Due to common laboratory contamination in the semivolatile analysis, several samples were qualified as estimated. The findings were as follows:

- Due to common laboratory contamination problems, Bis(2-ethylhexyl)phthalate was qualified nondetect in two samples.
- All detected results reported below the RL were qualified as estimated.

C. No samples were reextracted or reanalyzed for semivolatile analysis in this SDG.

SW 846 PCB Analysis

A. No results for PCB analysis were rejected in this SDG.

B. Due to method blank and field blank contamination and compound identification problems in the PCB analysis, several samples were qualified as estimated. The findings were as follows:

- Due to method blank contamination problems, PCB-1016 was qualified nondetect in four samples.
- Due to field blank and equipment rinsate contamination problems, PCB-1016 was qualified nondetect in one sample.
- Due to compound identification problems, PCB-1016 detected results were qualified as nondetected in one sample.
- All detected results reported below the RL were qualified as estimated.

C. No samples were reextracted or reanalyzed for PCB analysis in this SDG.

SW 846 Metals Analysis

A. No results for metals analysis were rejected in this SDG.

B. Due to calibration and method blank contamination problems in the metals analysis, several samples were qualified as estimated. The findings were as follows:

- Due to calibration and method blank contamination problems, Antimony, Arsenic, Cadmium, Selenium, and Thallium were qualified nondetect in one sample, Barium, Copper, Lead, and Silver were qualified nondetect in two samples, and Mercury was qualified nondetect in three samples.
- All detected results reported above the MDL but below the RL were qualified as estimated.

C. No samples were reextracted or reanalyzed for metals analysis in this SDG.

TPH Gasoline Analysis

A. No results for TPH gasoline analysis were rejected in this SDG.

B. No samples were reextracted or reanalyzed for TPH gasoline analysis in this SDG.

TPH Extractable Analysis

A. No results for TPH extractable analysis were rejected in this SDG.

B. Due to problems in the TPH extractable analysis, several samples were qualified as estimated. The findings were as follows:

- All detected results reported below the RL were qualified as estimated.
- All detected results flagged with a "D" or "M" by the laboratory were qualified as estimated.

C. No samples were reextracted or reanalyzed for TPH extractable analysis in this SDG.

Non-CLP Inorganic and Physical Analysis

A. Due to severe problems in the MS and LCS/LCSD in the non-CLP inorganic and physical analysis, selected sample results were rejected. The findings were as follows:

- Due to MS recovery problems, Reactive Cyanide nondetected results were rejected in samples 100-VLT630-018 and 100-VLT630-018A.
- Due to LCS/LCSD recovery problems, Reactive Cyanide nondetected results were rejected in samples 100-VLT630-018 and 100-VLT630-018A.

B. Due to problems in MS and LCS/LCSD in the non-CLP inorganic and physical analysis, several samples were qualified as estimated. The findings were as follows:

- Due to MS recovery problems, Reactive Sulfide nondetected results were qualified as estimated in two samples.
- Due to LCS/LCSD recovery problems, Reactive Sulfide nondetected results were qualified as estimated in two samples.

C. No samples were reextracted or reanalyzed for non-CLP inorganic and physical analysis in this SDG.

III. The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be estimated (J) are usable for limited purposes only. Sample results that were found to be rejected (R) are unusable for all purposes. Based upon the cursory data validation, all other results are considered valid and usable for all purposes.

APPENDIX F

HAZARDOUS WASTE MANIFEST

266772

State of California—Environmental Protection Agency
Form Approved OMB No. 2050-0039 (Expires 9-30-99)
Please print or type   Form designed for use on elite (12-pitch) typewriter

See Instructions on back of page 6.

Department of Toxic Substances Control
Sacramento, California

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No	Manifest Document No.	2. Page 1 of 1	Information in the shaded areas is not required by Federal law
[illegible]	[illegible]		

3. Generator's Name and Mailing Address
Commander National Training Center & Ft Irwin c/o Chenega Management LLC
PO Box 10954
Fort Irwin, CA 92310

4. Generator's Phone ( ) 760-380-[illegible]

A. State Manifest Document Number: 23395218

B. State Generator's ID

5. Transporter 1 Company Name: General Environmental Mgmt Inc
6. US EPA ID Number: CAD983649880

C. State Transporter's ID [Reserved]
D. Transporter's Phone: 626-442-7200

7. Transporter 2 Company Name
8. US EPA ID Number

E. State Transporter's ID [Reserved]
F. Transporter's Phone

9. Designated Facility Name and Site Address
DK Environmental
3650 E. 26th Street
Vernon, CA 90023

10. US EPA ID Number: CAT080033681

G. State Facility's ID: CAT080033681
H. Facility's Phone: 323-268-5056

11. US DOT Description (including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste Number
a. Non-RCRA hazardous waste, solid (oily debris)	003	CM	03600	P	State 352; EPA/Other N/R
b. Non-RCRA hazardous waste, solid (spent hoffman devices)	006	DM	00527	P	State 181; EPA/Other N/R
c. Non-RCRA hazardous waste, solid (soil)	008	DM	05400	P	State 521; EPA/Other N/R
d. Non-RCRA hazardous waste, liquid (wash water)	002	DM	00800	P	State 343; EPA/Other N/R

J. Additional Descriptions for Materials Listed Above
11. a) Profile# 340608-42 3 X METAL BIN 4X7
11. b) Profile# 340608-[illegible] 6 X 55
11. c) Profile# 350316-71 8 X 55
11. d) Profile# 350316-7D 2 X 55

K. Handling Codes for Wastes Listed Above
a. 03 b. 03
c. 03 d. 15

15. Special Handling Instructions and Additional Information
ERG 11 a) N/A
11 b) N/A
11 c) N/A
11 d) N/A

24 Hour Emergency Number
1-800-326-1011

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name	Signature	Month	Day	Year
JUSTINE E. DUMAS	[signature]	03	08	05

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year
FRED OSBURN	[signature]	03	08	05

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year

19. Discrepancy Indication Space

DK ENVIRONMENTAL FACILITY IN LOS ANGELES, CALIFORNIA HAS THE APPROPRIATE PERMITS TO RECEIVE YOUR WASTE STREAM AS QUALIFIED OUR EPA NUMBER IS CAT080033681

20. Facility Owner or Operator Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Printed/Typed Name	Signature	Month	Day	Year
Rocky Arenda	[signature]	03	17	05

IN CASE OF EMERGENCY OR SPILL, CALL THE NATIONAL RESPONSE CENTER 1-800-424-8802; WITHIN CALIFORNIA, CALL 1-800-852-7550

GENERATOR / TRANSPORTER / FACILITY

DO NOT WRITE BELOW THIS LINE.

Yellow: TSDF SENDS THIS COPY TO GENERATOR WITHIN 30 DAYS. (Generators who submit hazardous waste for transport out-of-state produce completed copy of this copy and send to DTSC within 30 days.)

DTSC 8022A (1/99)
EPA 8700—22